Southern Power & Industry

The Industrial and Power Journal of the South and Southwest

MAY, 1958

SPI . . . 55th Year

REACHES industrial plants (manufacturing, process, utility and large service) in the South & Southwest.

SERVES plant managers, superintendents, engineering department heads and plant operating staffs.

PROVIDES information to solve design, installation, operating and plant maintenance problems.

SPI

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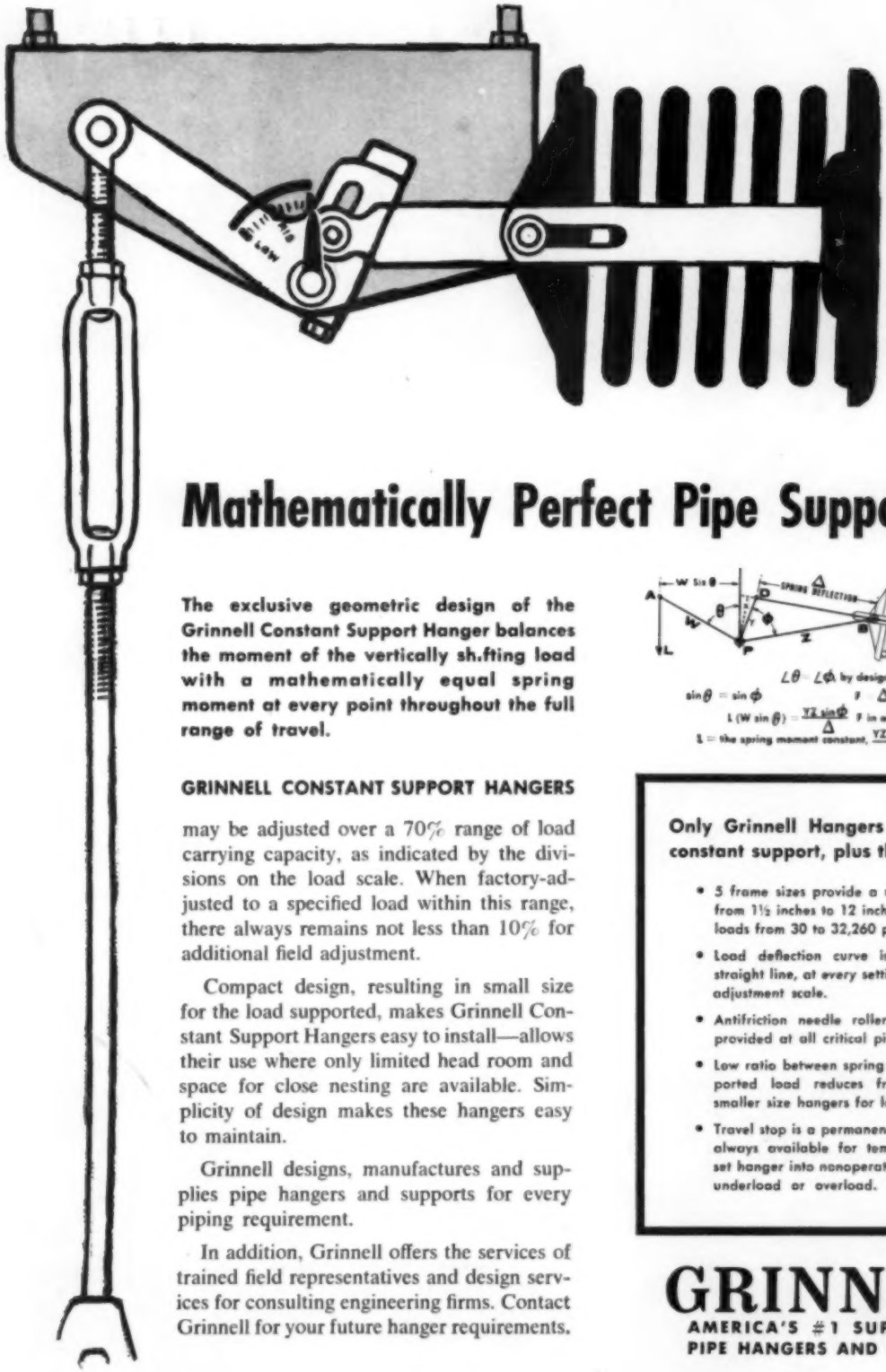

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The exclusive geometric design of the Grinnell Constant Support Hanger balances the moment of the vertically sh.fting load with a mathematically equal spring moment at every point throughout the full range of travel.

GRINNELL CONSTANT SUPPORT HANGERS

may be adjusted over a 70% range of load carrying capacity, as indicated by the divisions on the load scale. When factory-adjusted to a specified load within this range, there always remains not less than 10% for additional field adjustment.

Compact design, resulting in small size for the load supported, makes Grinnell Constant Support Hangers easy to install—allows their use where only limited head room and space for close nesting are available. Simplicity of design makes these hangers easy to maintain.

Grinnell designs, manufactures and supplies pipe hangers and supports for every piping requirement.

In addition, Grinnell offers the services of trained field representatives and design services for consulting engineering firms. Contact Grinnell for your future hanger requirements.

Only Grinnell Hangers provide true constant support, plus these features:

- 5 frame sizes provide a range of travel from 1½ inches to 12 inches and support loads from 30 to 32,260 pounds.
- Load deflection curve is a horizontal straight line, at every setting on the load adjustment scale.
- Antifriction needle roller bearings are provided at all critical pivot points.
- Low ratio between spring force and supported load reduces friction, permits smaller size hangers for loads carried.
- Travel stop is a permanent attachment — always available for temporary use to set hanger into nonoperative position for underload or overload.

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AMERICA'S #1 SUPPLIER OF PIPE HANGERS AND SUPPORTS

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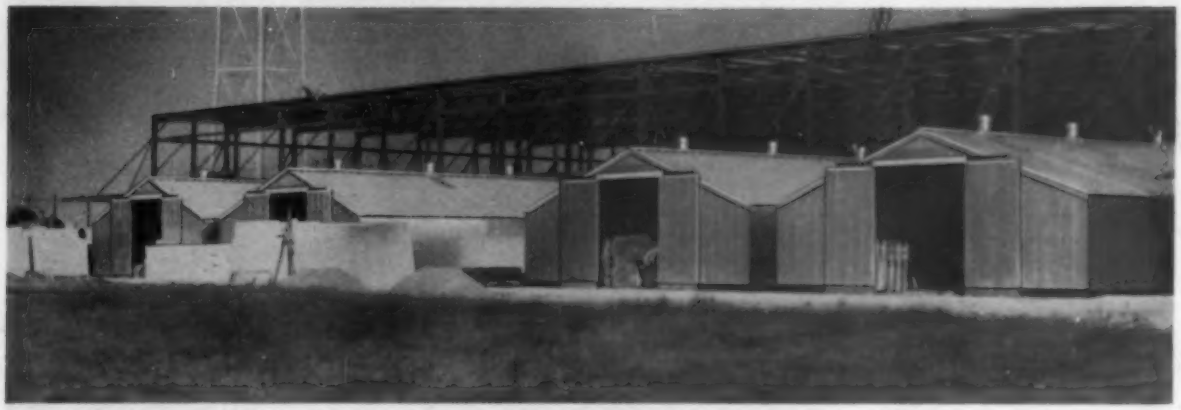
Volume 76 Number 5

How a Contractor and a Manufacturer Saved Money with an Armco Steel Building



Four Armco Steel Utility Buildings, in foreground, provide shelter for textile machinery while the new Carlisle Finishing Company plant is being completed. Later, they were dismantled and moved to other cities for re-erection on permanent sites.

Consulting Engineer:
J. E. Sirrine Company,
Greenville, South Carolina

When Carlisle Finishing Company, Carlisle, South Carolina, drew up plans for a new plant, the company and the building contractor made a novel agreement that saved money for both of them!

The contractor, Daniel Construction Company, Inc., of Greenville, South Carolina, put up an economical 70- x 140-foot Armco Steel Building for their use during construction of the main plant. After construction work was completed, the Armco Building was turned over to Carlisle, a division of Cone Mills Corporation, textile manufacturers of Greensboro, North Carolina. Now it's a permanent warehouse.

On the same project, company officials had the problem of storing textile machinery arriving before the plant was completed. As a solution, they erected four Armco Utility Buildings, each 36 by 48 feet, adjacent to the site for this purpose. After the new plant was completed, two of the buildings were dismantled, moved about 150 miles to Greensboro, North Carolina, and re-erected at the owner's White Oak Plant. The other two buildings were also dismantled and sent to the Greenville, South Carolina, plant to be used for storage.

In each case, an Armco Building provided shelter at the construction site and was later used as a permanent structure for another purpose.

* * *

Armco Buildings, with their all-bolted construction that simplifies erection or re-erection, are one of the more than 30 Armco Drainage and Construction Products for industrial, municipal, highway and railway applications. Write for data.

This Armco Steel Building was purchased by the Carlisle Finishing Company to serve as shop, office and equipment storage for the contractor. According to plan, it was later used as a warehouse by the owner.

These Armco Utility Buildings are shown here after being dismantled, moved 150 miles, and re-erected at another of the owner's plants.

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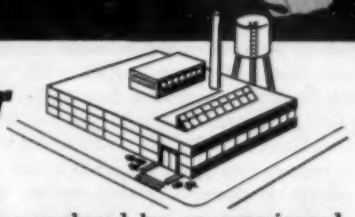

Now you can have scale, rust, grease and other objectionable deposits removed from your boilers, condensers and other heat exchange equipment. An Anderson Chemical Company mobile cleaning unit will come to your plant, anywhere in the Southeast, and remove those unwanted deposits. The special equipment and technical knowledge required are brought to you at a time when your equipment can be out of service for 24 hours without hampering production.

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Southern Power & Industry

The Industrial and Power Journal of the South and Southwest

Eugene W. O'Brien
Managing Director

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Facts and Trends

May 1, 1958

◆ MEN--IN THE PLANTS--are the fellows who consider equipment details, provide service experience, estimate performance and consider maintenance costs and equipment dependability.

On the following pages of SPI'S 12th Annual PLANT MAINTENANCE Issue, Southern & Southwestern maintenance and operating personel explain their problems and tell how they have overcome difficulties and improved service. Note the following plant-tested procedures.

◆ MAINTENANCE ORGANIZATION of Chemstrand's Decatur, Alabama plant features a combination area and central shops set-up operating under the plant engineering department. The maintenance group handles capital addition jobs, major maintenance expense jobs (each $1,000 or over), and minor maintenance expense jobs. On pages 36-39, Paul Taylor, Chemstrand's senior supervising engineer, details how work order procedures related to minor maintenance expense jobs (under $1,000 each) were recently streamlined. Four big benefits are tabulated.

◆ ELECTRONICS is replacing "trained fingertips" and "educated screw drivers" in detecting and measuring vibration and correcting imbalance. Equipment at Potomac Edison Company at Hagerstown, Maryland had the "shakes" and there was a long time to wait before the next scheduled shutdown.

Pages 42-43 show how engineers used electronics to troubleshoot and measure the vibration. After corrective balancing, vibration level was reduced to a maximum of four-tenths of one mil at any measuring point.

◆ ONE FORM controls all "minor" maintenance troubles in the modern plants of Southwestern Public Service Company. On pages 44-45, engineers describe how minimum "paper work" gives excellent control of maintenance work including pump and valve packing, oil leaks, insulation, pump testing, bearing inspections, etc. ONE FORM and ONE FILE does the trick.

◆ PRE-PUNCHED CARDS, controlling maintenance stock at Acipco in Birmingham, speed withdrawal of parts and avoid the necessity for a stores clerk. Specialized card procedure fits right in with the standard IBM system of records and cost accounting. Details on page 47.

◆ POWER DISTRIBUTION Check List starting on page 48 will help you reduce outages and make your troubles minor. Study the comments on bushings, cables, switches, bus bars, circuit breakers, relays and transformers. Then work up your own check-list and schedule the frequency of requirements for the system which is your responsibility.

(Continued on Page 6)

90% open spacer in new Exide-Manchex gives you more power, sustains it longer

Now even better. New-design Exide-Manchex Batteries feature (1) suspended plates; (2) high level electrolyte; (3) large sediment reservoir — dependable power for added years of use.

In between the plates of every new Exide-Manchex Battery there's an extra-thick layer of power-sustaining electrolyte that other plante-type batteries don't have. When the positive plate needs acid to meet a sustained load, the Exide-Manchex can supply it—quickly and in ample amount to produce the needed power at a higher end voltage.

This is only one of the practical ways you benefit from the new 90% open spacer now used in new Exide-Manchex Batteries. In addition, ions are freer to travel back and forth between the plates—during both normal and high current conditions. The greater open area reduces the battery's internal resistance. Hence it holds its voltage longer under high load. It is less subject to internal heating. And its life potential is significantly prolonged.

With this new design, Exide engineers have succeeded in making the world's most famous long-life battery even better. When you order batteries for float or cycle service in stationary applications, get the most value for your money. Specify Exide-Manchex. For detailed information, write Exide Industrial Division, The Electric Storage Battery Company, Phila. 2, Pa.

Exide®

Facts and Trends (Continued)

◆ THOSE MANUALS--When it comes to our $4,000 automobile, few of us lose any time in getting it to the grease rack every 2,000 miles --just like it says in the manual. But, when it comes to a $400,000 machine tool, the manual is thrown out of the window, and every effort is made to get out of the machine every ounce of production--nonstop, 24 hours a day.

Let's not "short-change" preventive maintenance--minor tasks which take only minutes can help increase machine life thousands of hours, reduce production downtime, and speed up the write-off of the machine.

◆ INDUSTRIAL FACT FOLDERS--An extensive "Fact-Folder" product reference service is being offered by Reynolds Aluminum Supply Co., one of the Southeast's largest industrial supply companies. Handy reference folders offer up-to-date data on industrial metals, insulation, roofing & siding, glass fiber panels, polyethylene & other industrial supplies. Note item 599 on page 85.

◆ FROM HEAT . . . DIRECT to Electricity--Check page 32 which highlights an M.I.T. development--an "engine" which will convert atomic heat DIRECTLY into electricity. It is a thermo-election device which operates without any moving mechanical parts.

◆ "THERMOS" INSULATION, an all-metal reflective prefabricated design by Mirror Insulation Co. is made up of air spaces, partitioned by reflective metal sheets. Details on page 88. Insulation will handle temperatures of minus 400 F to plus 2,000 F.

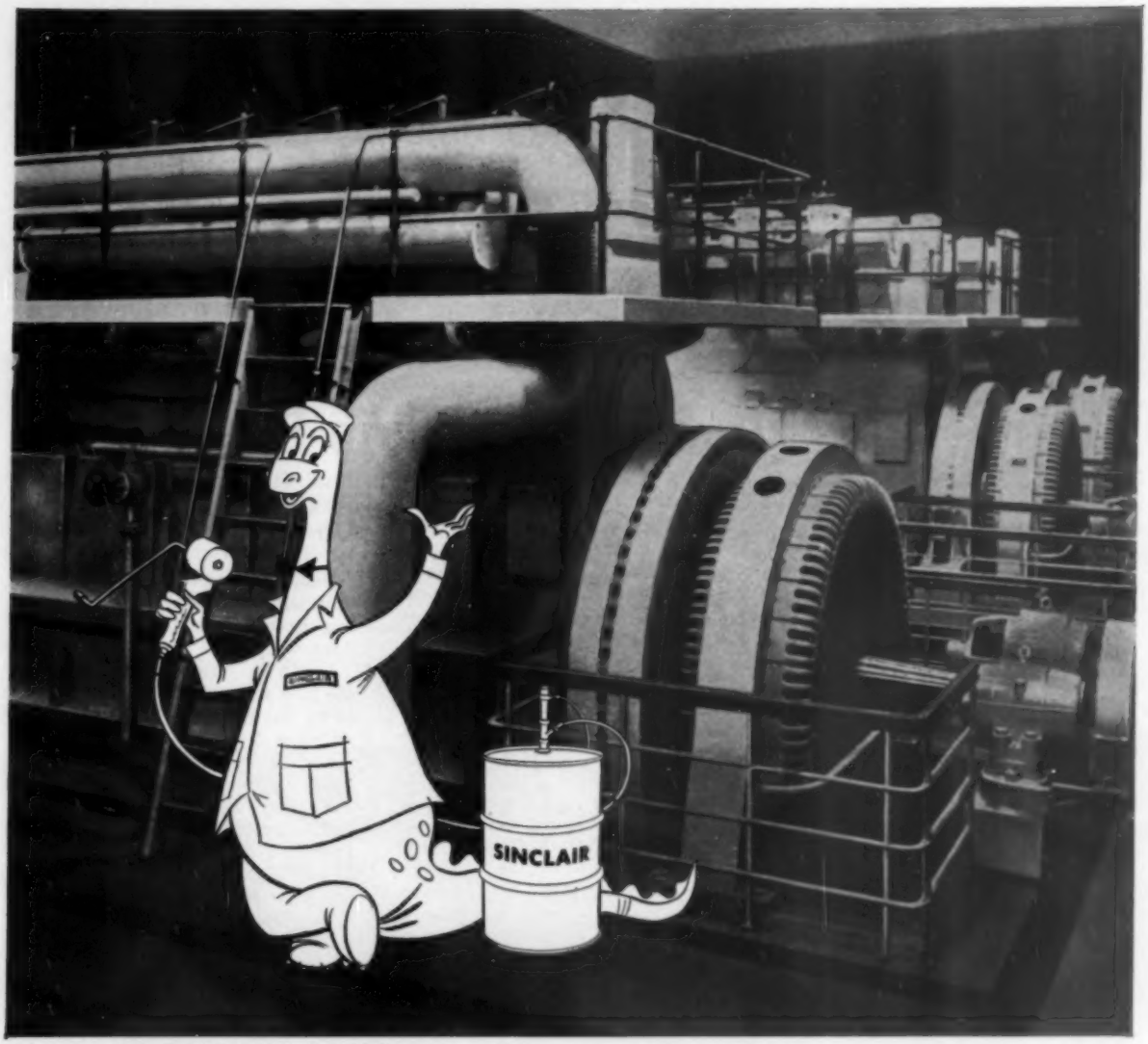
◆ NEW NEOPRENE RUBBER-COATING called Charcote can be brushed on, rolled on, sprayed or used as a dip. Page 83 shows how it offers the plant engineer excellent protection against corrosive fumes, sale spray, abrasion and moisture.

◆ MAINTENANCE LABOR COSTS actually exceed the cost of production labor in many plants. At Du Pont's 1,000-acre Sabine Riber Works in Texas, 23% more maintenance men are employed than production men. Few companies have this high a ratio, but month by month, plant maintenance costs creep up and up in virtually every plant.

The same high labor costs that forced management to take production out of the workers' hands and put it into automatic processing are back again--but this time it's the cost of maintaining the equipment. Your solution is one that's being heard again and again--BUY THE BEST EQUIPMENT ON THE MARKET.

◆ THE SOUTHEAST is now the second largest producer of electric energy regionally in the nation. In just 10 years following World War II, the seven Southeastern states have advanced from 4th to 2nd position. Last year's 108.4 billion kw/hr produced in the Southeast was exceeded only by the 162 billion produced in the East North Central States.

The growth continues with major new plants and expansions announced daily. Pages 8, 12, 14, 16 and 20 highlight major developments and detail management and operating engineers named for plants recently put on stream.



Maintenance tips from Dino, the Sinclair Dinosaur

NOW- less oil consumption

Sinclair RUBILENE® Oil has a great reputation in industrial Diesel applications – and for several good reasons. Engineers have found that Sinclair RUBILENE can cut oil consumption, reduce service time to a minimum. It prevents the formation of harmful carbon, sludge and varnish. It stands up under the highest operating temperatures, provides better lubrication protection to cylinders, pistons, rings and other vital moving parts.

Switch to Sinclair RUBILENE and lower your costs. Whatever the make or age of your Diesel, whatever your lubrication problem, there's a RUBILENE or RUBILENE HD Oil that should meet your requirements. Call your Sinclair Representative for further information or write for free literature to Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. There's no obligation.

SINCLAIR
RUBILENE OILS

For more information, use Reply Card—Page 83

NEWS for the South & Southwest

Engineers for New & Expanding Plants

Riegel Paper – N. C.

Riegel Paper Corporation's new paper mill at **Acme, North Carolina** is scheduled for production in mid-'58. The following appointments have been announced:

A. L. Wiley, assistant to the manager of paper production. Mr. Wiley was formerly assistant to manager of pulp production and has served as technical director and assistant production manager.

Brookshire C. Moore, superintendent, who comes to Riegel from East Texas Pulp & Paper Co.

C. Cline Peters, assistant to manager of pulp production. Mr. Peters was formerly assistant plant engineer.

Gerald A. O'Brien, formerly research and development engineer for Anglo Paper Products, Limited of Canada, mechanical engineer.

Raymond Hall, coating supervisor, was previously assistant technical director specializing in machine coating for Allied Paper Corp.

Two assistant paper mill superintendents have also been appointed — **E. A. Henry** (Technical) and **Henry Brodnax** (Operations). Mr. Henry was formerly assistant pulp mill superintendent, while Mr. Brodnax was assistant paper mill superintendent for Potlatch Forests, Inc.

G-E – Rome, Ga.

Milton L. Andersen is now manager of manufacturing for General Electric's Medium Transformer Department at Rome, Georgia. Mr. Andersen comes to Rome from a similar position with the Company's Oakland transformer plant and replaces **David Hopley,** who is retiring. **D. B. Lawton** is department general manager.

Du Pont – N. C.

Nearing completion on a 10,500 acre site in **Brevard, N. C.** is the hyper-pure silicon plant for **Du Pont Co.**

Leslie S. Grogan is manager of the new plant which will be operated by the Pigments Department and which will initially employ 200 persons.

The plant is expected to have an annual capacity of 50,000 lb of semi-conductor grade silicon and 20,000 lb of "solar-cell" grade silicon. The former material is used in the manufacture of such devices as transistors, diodes and power rectifiers and sells for $320 a pound. The latter, selling at $150 a pound, is used in "solar batteries."

FWS&M – Texas

Clifford Jaggers, formerly general superintendent of metal fabrication, is now general superintendent of the Fort Worth, Texas plant of Fort Worth Steel & Machinery Company. **R. A. Hawley,** vice president in charge of manufacturing, states that Mr. Jaggers' position is a new one created for stronger management of production.

James B. Green, formerly Midwest district manager for Jeffrey Manufacturing Company is the new manager of Fort Worth's Engineering Sales Division. This division provides wholly-engineered plant systems for handling and processing bulk materials. **L. B. Temple,** former head of the division, has been assigned to cotton oil mill engineering sales and new market developments.

R. E. Persohn is now assistant general manager of the Gadsden, Alabama works of Allis-Chalmers.

Anderson Electric's vice president in charge of operations is **John H. Schuler,** who will supervise manufacturing, purchasing and personnel at Anderson's Birmingham and Leeds, Alabama plants.

Robert J. Brown is plant manager of Airtronics International Corporation's Hialeah, Florida plant, which manufactures precision gears and plastics components for the aircraft and guided missile program. **Robert G. Kramer** is president.

Walter R. Gerich is chief engineer handling all mechanical and electrical engineering for Maryland Shipbuilding & Drydock Company, Baltimore, Md. **Freeman W. Lohr** is plant engineer in charge of all plant construction, maintenance and repair.

You know you're safe with USS National Seamless Tubes

In a giant superheater like this, or in any tubular installation where pressures and temperatures are intense, where strength is critical, power engineers specify "National Seamless Steel Tubes." Reason: National Seamless gives longer, safer, more dependable, more economical service. And what more could any tubular product offer?

For further details, send for Bulletins 12 and 26. For technical assistance, don't hesitate to get in touch with us. Our mill service force is available for field consultation. Write to National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

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Photo courtesy of Combustion Engineering, Inc.

National Tube Division of USS United States Steel

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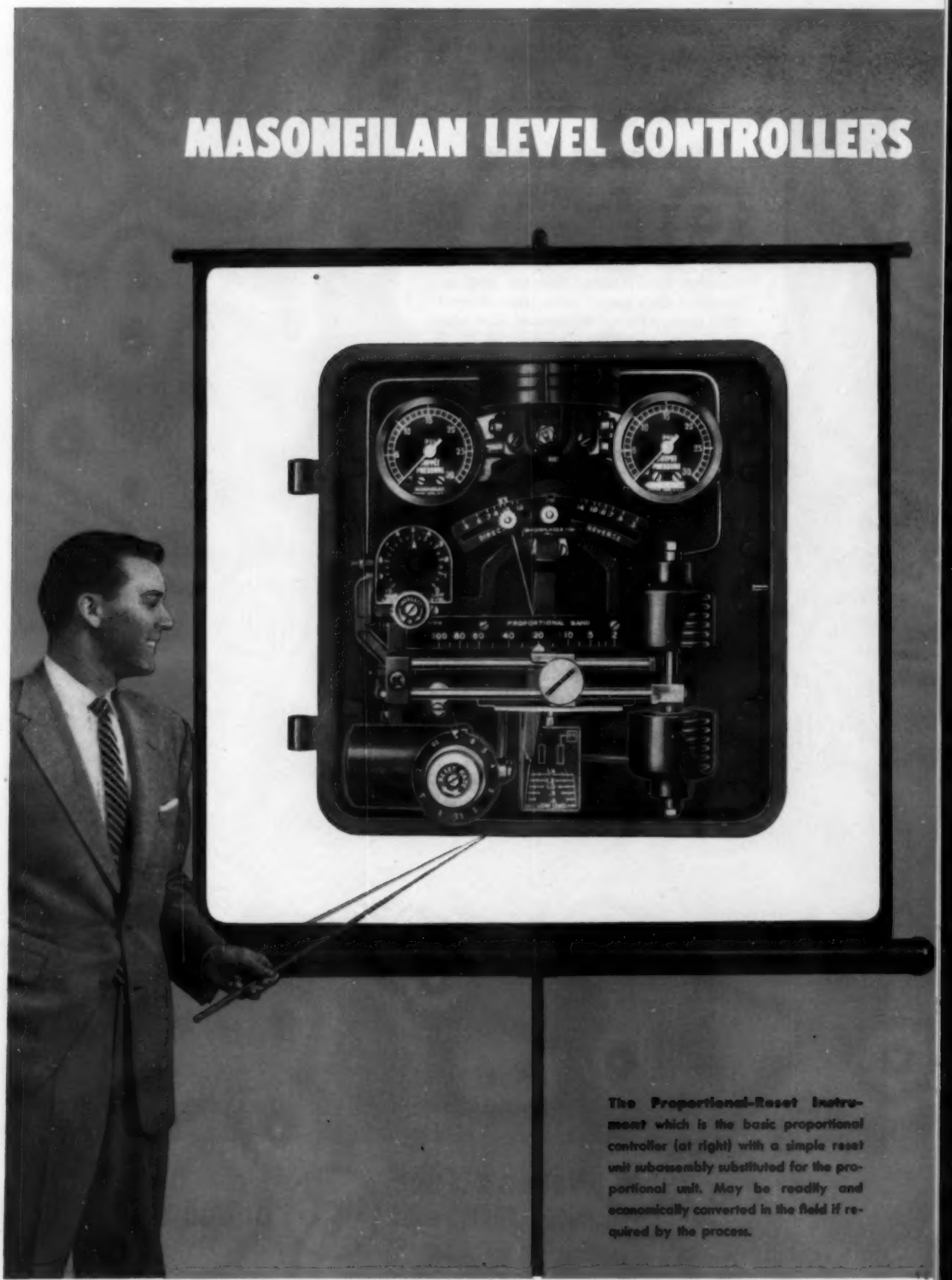
MASONEILAN LEVEL CONTROLLERS



The Proportional-Reset Instrument which is the basic proportional controller (at right) with a simple reset unit subassembly substituted for the proportional unit. May be readily and economically converted in the field if required by the process.

DESIGNED FOR SPECIAL APPLICATIONS, TOO!

Versatile 12000 Series Provides Proportional-Reset Action in a Single Case

In addition to meeting all usual liquid level control requirements, the Mason-Neilan design provides for those few special applications where proportional reset action is advantageous, such as . . .

Precise Control — in, for example, short zone, subcooling type feedwater heaters

Wide Proportional Band — without change of control mechanism

Maintaining Accurate Mean Level — for maximum surge capacity

Moreover this reset action is available with the standard instrument — either the single unit or in the duplex type, which may include a transmitter or other controller.

The advantages of such a one-case controller include:

- *Lower Original Cost*
- *A Single, Simple Pneumatic System*
- *Compactness*
- *Easier Start-up and Adjustment*
- *Simpler Installation and Servicing*

Only Masoneilan 12000 Series offers these advantages. It will pay you to get the whole story. Complete, detailed catalog will be sent on request. Ask your nearest representative or write

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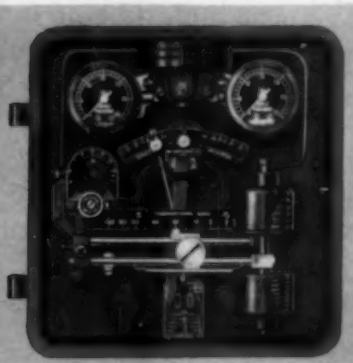
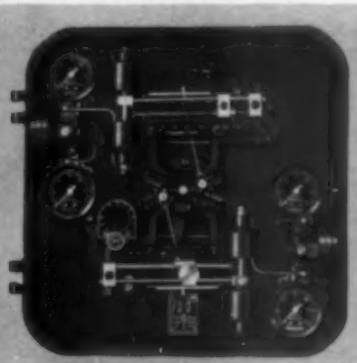
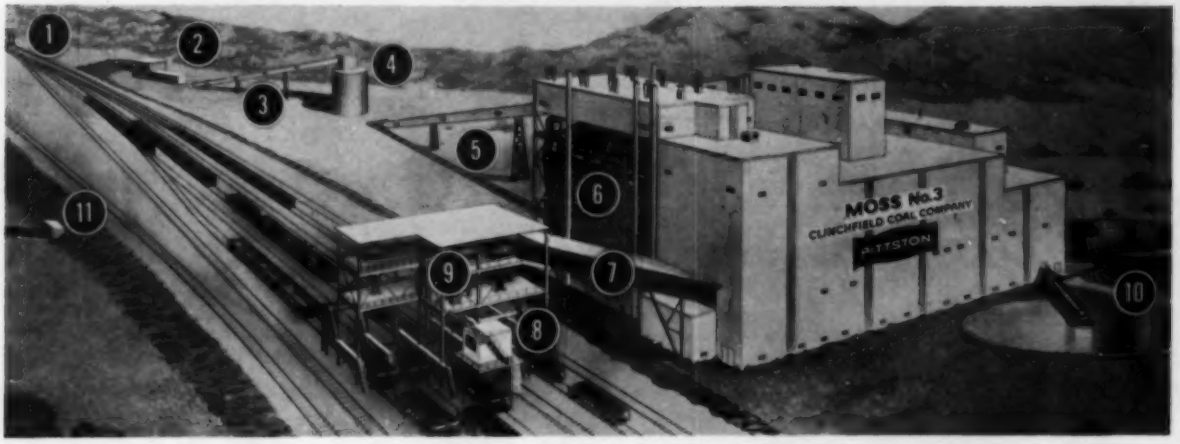


The Basic Proportional Controller satisfies the vast majority of level control applications. Available also with Pneumatic Set and for Differential Gap control.



The Duplex Controller combines a controller and transmitter (or two controllers) — actuated by a single displacer and torque tube. It is contained in a single larger case.

12000 Series Controllers are available in a wide variety of mountings and connections; level ranges; pressure and temperature ratings — types for all applications.



Va. Coal Preparation Plant Will Handle 1,500 tons/hr

Clinchfield Coal Company, a Division of The Pittston Company, is building an ultra-modern automated coal preparation plant at **Clinchfield, Virginia.** To be known as Clinchfield's Moss No. 3, the new facility will wash, dry and screen 1,500 tons of run-of-mine coal per hour.

Contract has been awarded the Link-Belt Company, who also designed, equipped and erected the Moss No. 2 plant in 1956. Plant design includes dual facilities and stand-by equipment to permit maintenance during operating shifts.

Moss No. 3 plant will wash, dry and screen 1,500 tons of run-of-mine coal per hour and is scheduled for completion during the latter part of 1958. The following features of the huge plant are indicated by number: 1, rotary railroad car dumper; 2, crusher house; 3, transfer belt conveyor; 4, surge bin; 5, raw coal belt conveyor to plant; 6, Multi-Louvre dryers; 7, clean coal belt conveyors; 8, loading control tower; 9, loading station; 10, three thickeners and 11, refuse belt conveyor.

The 2,500 ft long turn-over slope belt conveyor will carry refuse from the plant to a nearby mountain top for disposal. This is used to avoid build up of material on the underside of the belt, as well as on the idlers or rollers over which the belt passes. The belt is turned over after discharging the material and returns with the top side of the belt up. At the bottom of its run, the belt is turned again to its normal position. The mine refuse is transferred from the slope belt conveyor to a traveling belt conveyor stacker for final disposal.

NEW $2 MILLION PLANT FOR FLINT STEEL – TULSA

The new $2,000,000 **Flint Steel Corporations** plant in **Tulsa, Okla.** will be completed in early summer.

Seven connecting structures are being constructed on the company's new 40-acre site at 2440 S. Yukon. The new facility will be one of the largest completely integrated steel fabricating plants in the Southwest. . . . The seven main connecting buildings, plus an office building, will comprise the plant facilities. The building will consolidate all operations of the plant, including storage of raw materials and shipping departments, under one roof — 383,000 sq ft.

Flint Steel Corporation fabricates pressure vessels for the process industries, structural and reinforcing steel for buildings and bridges, galvanized steel, transmission towers and sub-stations for utilities and operates a steel warehouse.

Company also has a fabricating plant at Memphis, Tenn., which manufactures tanks for the transportation, storage and distribution of LP gas and anhydrous ammonia fertilizer. The Memphis plant employs approximately 100.

$1 Million Auto Parts Plant for Mississippi

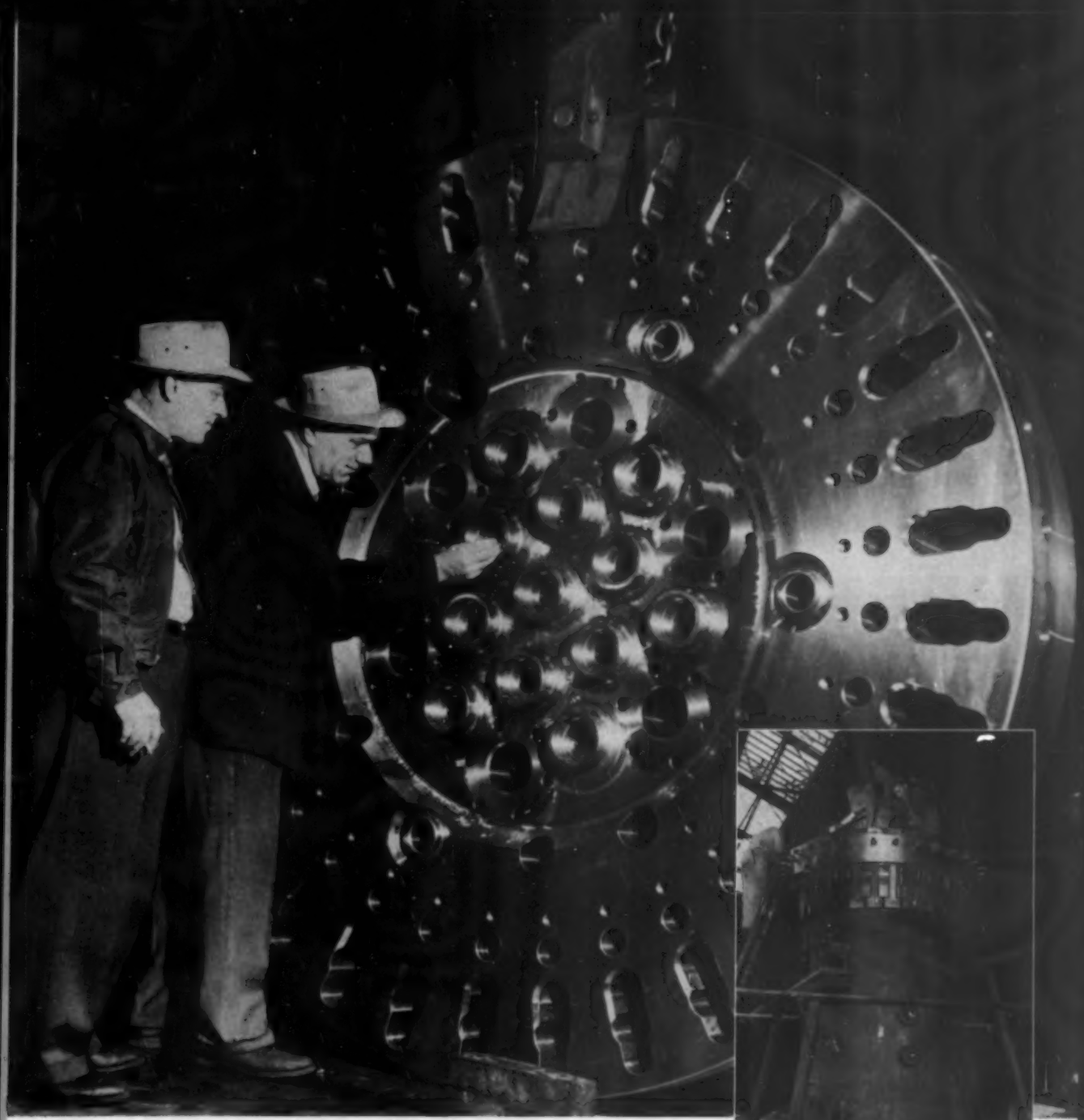
A million dollar plant will be located at **Aberdeen, Miss.** by the **Walker Manufacturing Company** of Racine, Wis. for the manufacture of auto tailpipes.

A 140,000 sq ft building is to be built under BAWI terms. The contract between the firm and Aberdeen authorities, calls for initial employment of at least 125 men, with provisions for the employment of 375 at capacity production.

Edgcomb Steel – N. C.

Edgcomb Steel Company has announced the building of a new and modern metals products warehouse and office containing 50,000 sq ft in **Greensboro, North Carolina.** The investment of plant and inventory will total $1,500,000, and the opening date has been set for the fall of 1958.

W. J. Winter, who has been associated with the Edgcomb Steel Company Charlotte Warehouse for the past twelve years in sales and administrative capacities, will manage the new Greensboro operation.



This pressure vessel had to be designed with a closure that would open in 30 minutes, and withstand 1500 psi, 550F. Made of Type 304 stainless, the top head has 34 connections, of which 19 required exceptionally close tolerances for control rods.

FOR NUCLEAR NEEDS of Knolls Atomic Power Laboratory, M. W. Kellogg was given the exacting assignment of designing and producing a 32½-ton "Proof Test Reactor Pressure Vessel". This was an unusually complex task, because of the quick-opening closure specifications, requiring a head with novel design and extremely close tolerance machining.

FOR NUCLEAR NEEDS of others, Kellogg is supplying the primary coolant stainless piping for two nuclear plants. In addition, Kellogg is equipped to engineer and manufacture heat exchanger equipment for nuclear energy power plants. If these specialized skills suggest a solution to *your* nuclear problems, call Kellogg's Fabricated Products Sales Division.

THE M. W. KELLOGG COMPANY, 711 THIRD AVENUE, NEW YORK 17.

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M KELLOGG W

Miami Warehouse for J. M. Tull

The New Miami Branch of the Atlanta headquartered **J. M. Tull Metal & Supply Company, Inc.,** was formally opened April 18-19th. The 50,000 sq ft warehouse-office-sales department, in operation since November, 1957, is located at 6201 N.W. 36th St. **J. M. Naylor** is Manager of the Miami operation.

New facilities, designed to efficiently handle the sale and distribution of metals, metal accessories and industrial specialties, are equipped with the latest type of handling equipment, modern cutting and shearing machinery. Heavy overhead cranes serve all parts of the building.

Forty of the Tull Company's principal suppliers had exhibits and technical personnel at the opening to discuss metal fabricating, welding and machinery problems:

Alloy Steel Products Co.; Aluminum Co. of America; American Brass Co.; American Brass Co., Metal Hose Div.; American Smelting & Refining Co.; Arcos Corporation; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Corp.; Belmont Packing & Rubber Co. G. O. Carlson Co.; Carpenter Steel Co.; Colonial Plastics Manufacturing Co.; Cross Engineering Co.; Driver Harris Co.; Electric Steel Foundry Co.; Handy and Harman; Hills McCanna Corp.; H. M. Harper Company; Independent Nail & Packing Co.

International Nickel Co.; Jones & Laughlin Steel Co.; C. O. Jelliff Manufacturing Co.; Lukens Steel Co.; National Tube Co.; NTH Products, Inc.; Parker Hannifin Corp.; Republic Steel Corp.; Revere Copper & Brass, Inc.; Rockwood Sprinkler Co.

Stainless Welded Products Co.; Superior Tube Co.; Tennessee Coal & Iron Co.; Titan Metal Manufacturing Co.; Horace T. Potts Co., Speedline Div.; H. T. Potts; Tube Turns, Inc.; Tube Turns, Inc., Plastic Div.; Van Huffel Tube Co.; Welding Fittings Corp.; and Wheeling Corrugating Co.

J. M. Tull will formally open the new **Birmingham, Alabama** warehouse with a Welding Clinic and Metal Show on May 13-15.

Harry Homer heads the new operation and **Lamar Williamson** is assistant branch manager. 50,000 sq ft warehouse is located at 1301 25th Avenue North.

Metal Extrusion Plant for New Albany, Miss.

An impact metal extrusion plant, to cost over $300,000 will be establishced in New Albany, Miss. in June by **First Mississippi Corporation.**

Impact metal extrusion is a relatively new process by which metal is cold-formed into various types of symmetrical objects by placing a heavy press to insert a plunger in the die, thus forming the metal in the desired shape. By cold-forming the metal, the tensile strength is increased. While the process has been used in this country for a number of years, it is only recently it has been used for forming containers other than toothpaste tubes.

Equipment for the New Albany plant was purchased in part from P. R. Mallory Inc., at Memphis. Heading the new plant will be **S. A. Clow** and **H. W. Smalley,** who were with the Memphis concern. Both have extensive experience in the impact extrusion field.

The building will be approximately 23,000 sq ft and about 75 persons will be employed when operating at capacity.

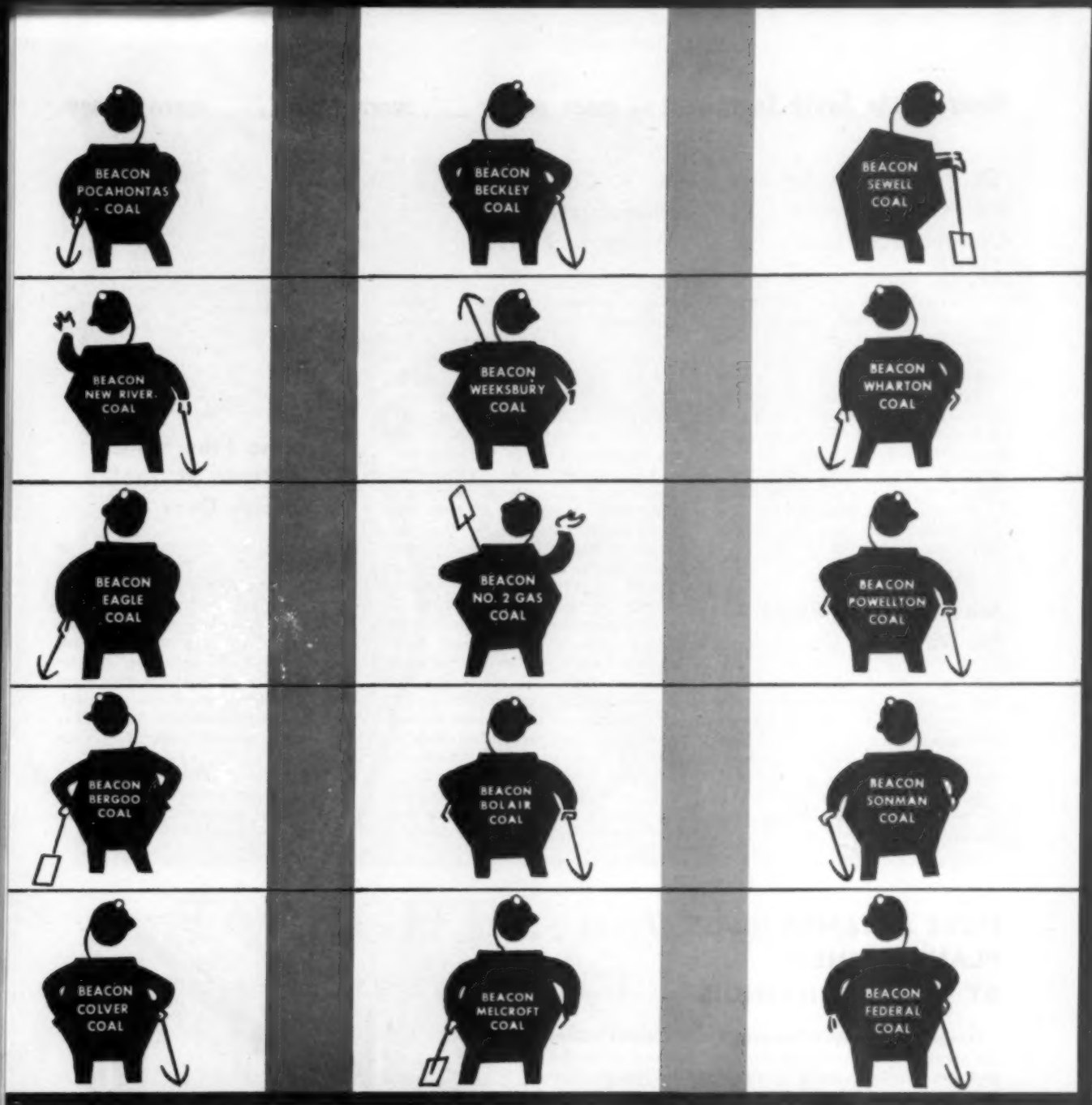
Kennecott Copper Refinery — Md.

Contract for design, procurement and construction of **Kennecott Refining Corp.'s** electrolytic copper refinery near **Baltimore, Md.** has been awarded to **M. W. Kellogg Co.**

The new refinery, to be located on a 200 acre tract at a cost of approximately $20,000,000, will have a capacity of 16,500 tons per month treating impure metal and increasing its purity.

Georgia Broiler Plant for Swift

Swift & Company has begun construction of a modern broiler processing plant in **Douglas, Ga.** Wesley and Company are contractors for the project, expected to be completed about October 1. Plant will employ about 100 initially.



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NORFOLK • PHILADELPHIA • SYRACUSE

For New England: New England Coal & Coke Co. • For Export: Castner, Curran & Bullitt, Inc.

'58 Production for Du Pont's Kansas Cellophane Plant

The Du Pont Company's 50 million pound per year cellophane plant near **Tecumseh, Kansas** (near Topeka) is under construction and is expected to start operations in the fall of 1958.

The Tecumseh plant will be Du Pont's fifth facility for the manufacture of cellophane. Other southern manufacturing plants are located at Old Hickory, Tenn. and Richmond, Va. Both of these plants have been substantially enlarged and modernized since they began operations in 1929 and 1930.

Mobile Home Plant for Douglas, Ga.

A three-building, 25,000 sq ft fabricating plant to be constructed in Douglas, Georgia by **Fleetwood Management Co.** of Anaheim, Calif. will employ 40 in producing luxury type house trailers.

Jack Kadera will be manager of the new plant and **Bill Ducas**, plant production manager.

N. Y. Conveyor Manufacturer Moves to Florida

After seventeen years in the New York metropolitan area, **Island Equipment Corp.** is moving its general offices and manufacturing facilities from Long Island City to Florida on June 1. This change places Island's conveyor manufacturing facilities in the rapidly expanding industrial section of the southeastern part of the country.

The new building, which will house both the general offices and the plant, is located at 1090 East 31st Street, Hialeah, in the outskirts of Miami. Constructed of concrete block and stucco, it covers 12,000 sq ft and its 15-ft ceiling allows for an additional 1,350 sq ft of mezzanine storage space. The layout is such that the raw materials and parts for the finished products — industrial conveyors and packaging-line equipment — will be received and then passed through processing and assembling in a U-shaped flow, until they reach the shipping platform.

A regional sales office, in charge of Island's vice president, Nicholas W. Gross, will be maintained at 135-20 39th Ave., Flushing 54, Long Island, N. Y. This will serve the company's present and prospective customers in the northeastern part of the United States. The rest of the country will be covered from the general offices, where John W. Stiles, president, will make his headquarters. The mailing address for the new location is P. O. Box 276, Miami 38, Florida.

Carolina Fiber Glass Yarn Plant at Shelby to Employ Over 800

Construction is underway in **Shelby, N. C.** on **Pittsburgh Plate Glass Company's** continuous fiber glass yarn plant, which will contain 350,000 sq ft of floor space. A multi-million dollar plant, the new unit, located on a 135 acre site, will be one of the world's largest fiber glass yarn producing operations. Approximately 850 persons will be employed when capacity operations are reached.

The plant structure is scheduled for completion within twelve months and partial production is expected to begin as soon as the building is

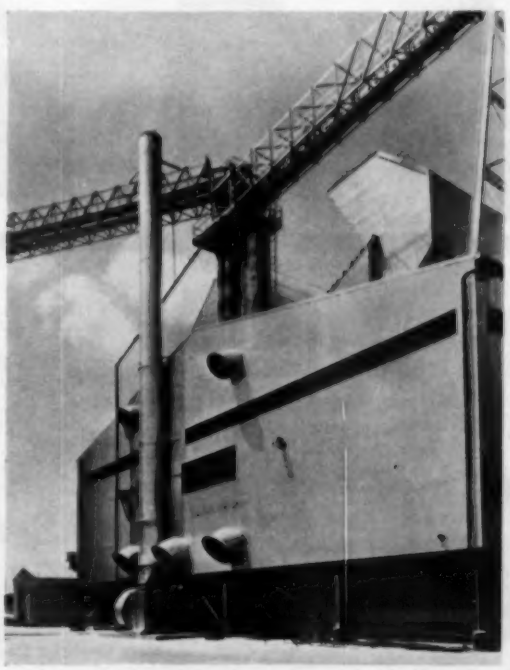
HUGE ATLANTA GLASS PLANT OPENED BY OWENS – ILLINOIS

Owens-Illinois Glass Company's new Atlanta, Georgia plant is now producing scores of millions of bottles and jars yearly, ranging in size from half-ounce vials to gallon jugs. Plant is on an 85-acre tract on Sylvan Rd, on the southern fringe of Atlanta near the municipal airport.

Harold Ottesen is manager of the new operation which employs approximately 800.

Photo shows the plant's corrosion resistant wrought iron smokestack, which guards against premature maintenance expense from accelerated oxidation created by high temperatures of conventional flue gases.

The 75-ft high by 3-ft diameter stack installation is fabricated of ¼-in. to 3/16-in. thick wrought iron plate. Identical protection against corrosion damage is provided at this plant in the breeching and oil tank, downspouts, and in cooling water and return lines piping applications. Stack fabrication was by J. J. Finnigan Company, Atlanta, with Standard Engineering Company of East Point, installers.



TONIGHT... new lights shine in America

Nation's First Commercial Electricity Produced From Atomic Power

It happened December 18, 1957, at Shippingport, Pennsylvania, U.S.A.

Not the familiar flash of a nuclear explosion but a silent surge of controlled power went out over the lines of Duquesne Light Company of Pittsburgh as the nation's first full-scale atomic power plant began to produce electricity for man's peace and progress. And around the world thoughtful men marked a new date on civilization's *constructive* calendar.

Heart of this 60,000 kilowatt plant lies below the ground in the core of the pressurized water reactor designed by Westinghouse Electric Corporation, prime contractor for A.E.C. Stone & Webster Engineering Corporation served Westinghouse as architect-engineer to develop the structural designs and construction drawings for the nuclear plant and to inspect the construction work.

Write or call our nearest office for information as to how our experience can be of assistance and profit to you.

STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY *of* STONE & WEBSTER, INC.

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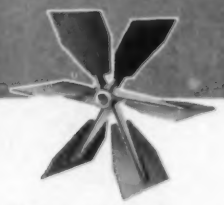
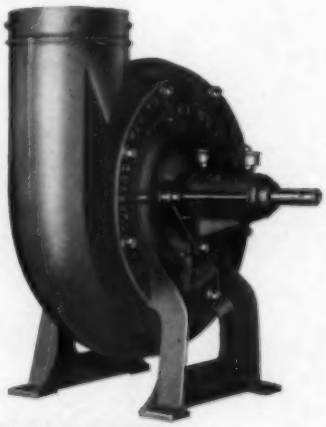
FAST ACTION DELIVERY

Clarage Industrial Air and Material Handling Fans



TYPE XL FANS. Distinguished by advanced design, high efficiency. Universal discharge, 3 different interchangeable wheel types available, reversible for either clockwise or counter-clockwise rotation with rim or open type wheels. Rugged, tight, fabricated steel construction. Pressures to 18" SP. **IMMEDIATE SHIPMENT** on all standard Arrangement 1 and 9 fans. Arrangement 4 and 8 fans also promptly available.



TYPE CI FANS. Proved performers in a wide range of services. Cast iron construction. Universal discharge, 2 different interchangeable wheel types available, reversible for either clockwise or counter-clockwise rotation. 6 sizes, pressures to 24" SP. **IMMEDIATE SHIPMENT** on all standard Arrangement 1 and 2 fans. Arrangement 4 and 8 fans also promptly available.

CALL TODAY the nearest Clarage sales engineering office:

ALBANY, N. Y.
ALBUQUERQUE, N. M.
ATLANTA, GA.
BALTIMORE, MD.
BILLINGS, MONT.
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BUFFALO, N. Y.
CHARLOTTE, N. C.
CHICAGO, ILL.
CINCINNATI, OHIO
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CORPUS CHRISTI, TEXAS
DALLAS, TEXAS
DAVENPORT, IOWA
DENVER, COLO.
DES MOINES, IOWA
DETROIT, MICHIGAN
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HARTFORD, CONN.
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OKLAHOMA CITY, OKLA.
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ORLANDO, FLA.
PHILADELPHIA, PA.
PITTSBURGH, PA.
PORTLAND, ORE.
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ST. LOUIS, MO.
SALT LAKE CITY, UTAH
SAN ANTONIO, TEXAS
SAN FRANCISCO, CALIF.
SEATTLE, WASH.
SHREVEPORT, LA.
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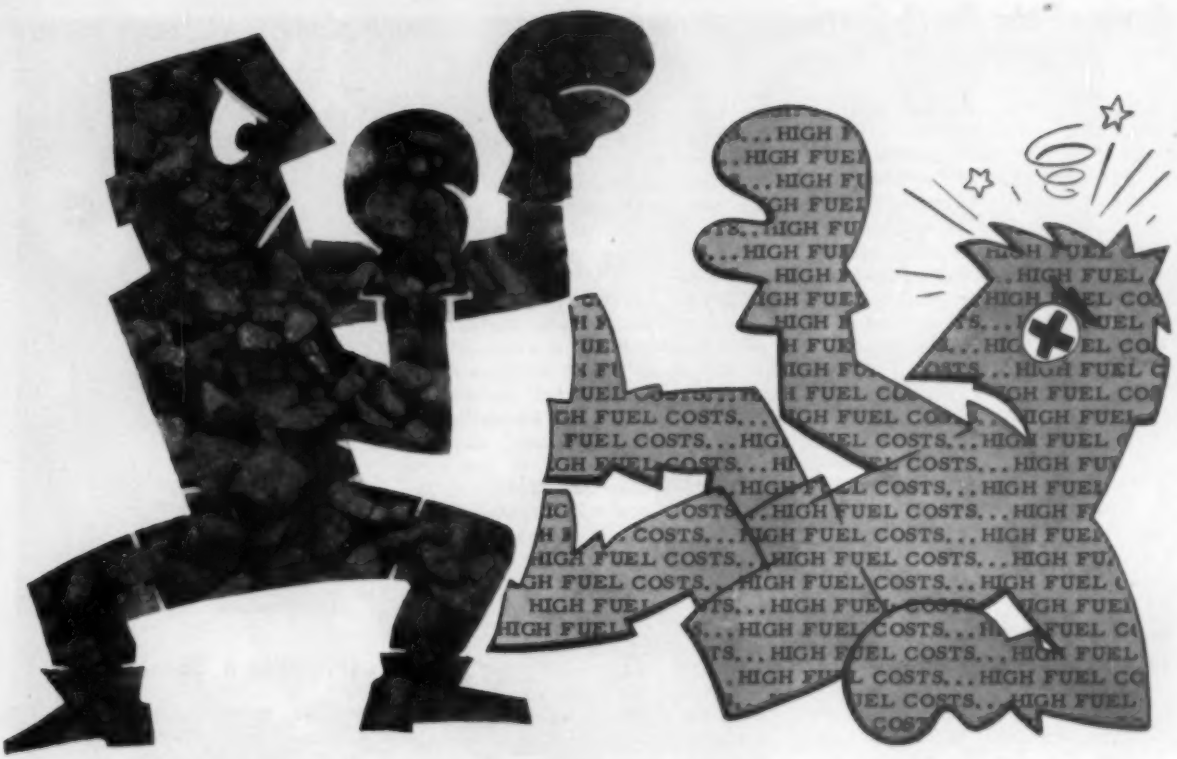
CLARAGE FAN COMPANY Kalamazoo, Mich.

CLARAGE ... *dependable equipment for making air your servant*

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal



More power to you!

There are wide differences in coal; wide differences in plant equipment and operation. When the two are matched, they team up to "knock down" steam generating costs.

This match-making can best be accomplished with the help of Norfolk and Western coal consultants. Tell these men about your operation, and they will recommend a *Fuel Satisfaction** coal "tailored" to your needs.

From seam to steam, every precaution is taken in the production, processing and transportation of *Fuel Satisfaction* coals to assure a product of the highest quality and uniformity. Every load of this superior Bituminous Coal can mean . . . *more power to you!*

**Fuel Satisfaction* is the name given the many fine brands of superior all-purpose Bituminous Coal mined along the N&W.

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For technical advice and assistance on utilization problems, consult with N&W fuel specialists. There's no obligation.

ROANOKE
N&W Coal Traffic Dept.
Telephone Diamond 4-1451, Ext. 313, 423, 249, 732
Roanoke, Virginia

BOSTON
833 Chamber of Commerce Building
Telephone Liberty 2-2229
Boston 10, Massachusetts

CHICAGO
Room 604, 208 South LaSalle Street
Telephone RAndolph 6-4634
Chicago 4, Illinois

CINCINNATI
913 Dixie Terminal Building
Telephone DUnbar 1-1325
Cincinnati 2, Ohio

CLEVELAND
Room 722, The Illuminating Building
Telephone MAin 1-7960
Cleveland 13, Ohio

DETROIT
1907 Book Building
Telephone WOodward 1-2340 or 1-2341
Detroit 26, Michigan

ST. LOUIS
2059 Railway Exchange Building
Telephone MAin 1-1180
St. Louis 1, Missouri

WINSTON-SALEM
1105 Reynolds Building
Telephone PArk 2-7116
Winston-Salem 1, North Carolina

completed. Two furnaces will be completed and ready for production when the structure is completed. Installation of the additional 14 furnaces will require an additional 18 months. The glassmaking area of the new plant will operate three shifts each day through a seven day week.

Designed capacity of the plant will make it one of the largest in the fiber glass industry. The new unit will have 16 glass furnaces capable of producing 25,000,000 pounds of yarn a year.

All known types of continuous yarns now being manufactured by the fiber glass industry will be produced in the North Carolina plant.

Georgia Tech Building Nuclear Research Lab.

Ground has been broken at the **Georgia Institute of Technology,** Atlanta, Ga. for the $600,000 Radioisotopes and Bioengineering Laboratory building.

The new laboratory building, which will contain about 16,000 sq ft devoted to research and educational facilities, will be among the very best educational and research facilities in this country in the radioisotopes and bioengineering fields.

Special provisions of the new laboratory will include Tech's subcritical assembly and a one-million volt Van de Graaff accelerator as well as specific areas devoted to subjects such as the biological effects of radiation and airborne bacteria. About 60% of the new building is devoted directly to radioisotopes and nuclear physics applications in educational research. The other 40% will be devoted to biological research.

B & W — Charlotte

The district sales office of **The Babcock & Wilcox Company's** boiler division has been moved to 1100 Wachovia Bank Building, 129 Trade Street from its former location at 913 Liberty Life Building, Charlotte.

SPI's Loyd B. Chappell Dies

Loyd B. Chappell of Loyd B. Chappell & Associates died recently at his home in Beverly Hills, California, after a short illness. Loyd and his organization have represented *Southern Power & Industry* and the other W. R. C. Smith publications on the West Coast since 1924.

He had a host of friends in advertising and marketing circles who will be saddened by his passing.

His conscientious and loyal efforts have been an important factor in building an appreciation of Southern markets among manufacturers and advertising agencies in the Western territory. He contributed substantially to the success and progress of the Smith publications.

For the more than thirty-three years that Loyd was our associate and friend we are profoundly grateful.

W. J. Rooke
Chairman of Board
W. R. C. Smith Publishing Company

SOUTHEAST Now Second Largest in U. S. Output of Electrical Energy

In just 10 years following World War II, the seven Southeastern states have advanced from the fourth largest producer of electric energy regionally in the nation to the Number 2 position, according to the U. S. Department of Commerce.

In 1957, 108.4 billion kilowatt hours of electric energy were produced in the seven states by utilities and industries, or more than three times the 31 billion kilowatt hours produced in 1947. Last year's 108.4 billion kw/hr produced in the Southeast was exceeded only by the 162 billion produced in the East North Central states.

The Southeast also led the nation in rate of increase. The West South Central section was second in percentage increase.

Huge Expansion Planned

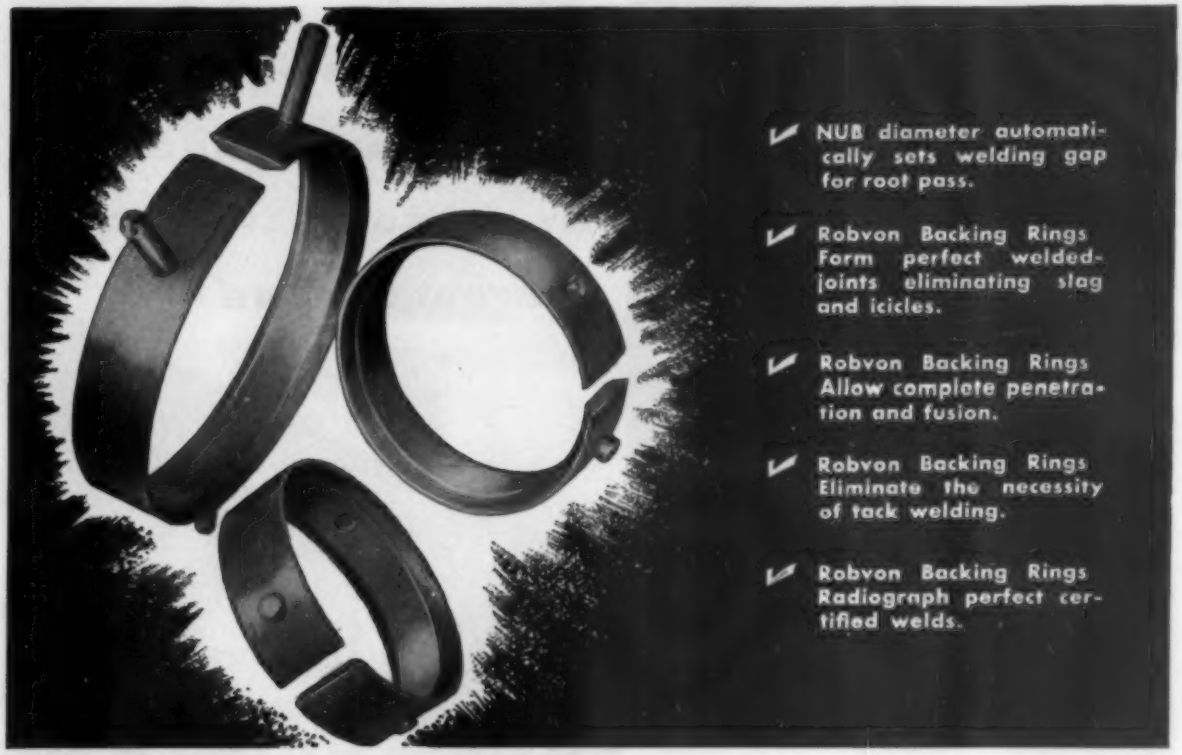
Forecasts of nearly all Southern and Southwestern utilities indicate huge construction programs during the coming years. **The Southern Company** forecast shows a construction program of $500,000,000 during the years 1958-1960. Since 1927 the rate of growth in the system companies' energy requirements has been slightly over 8% a year compounded annually, equivalent to a doubling of the load every nine years. Generating units to be installed during the next three years on the Southern Company system total 1,250,000 kw.

The 1958 program totals $155,000,000 for the Southern system companies: Alabama Power, Georgia Power, Gulf Power, Mississippi Power and Southern Electric Generating Company. This is the largest construction program in the history of the company.

Typical of expansion in the Southwest is a $21,000,000 electric power generating expansion program during the next three years for **Southwestern Gas & Electric Co.** This includes the addition of 100,000 kw units at company's two plants in Northwest Louisiana.

New Orleans Public Service Appointments

The appointment of **E. N. Avegno,** General Sales Manager, as Executive Assistant, and of **Charles J. Sinnott** to succeed Mr. Avegno as General Sales Manager has been announced by George S. Dinwiddie, President of **New Orleans Public Service Inc.**



ROBVON BACKING RINGS

APPROVED FOR WELDED PIPE, VALVES, AND FITTING JOINTS

Available in carbon steel, wrought iron, chrome alloys stainless steel, aluminum and copper

TYPE CCC Designed for quick easy alignment of pipe where the variation in inside diameters is relatively great. Chamfered NUBS allow close tolerance fit-up and CLEAN STRIKE OFF. The ROBVON NUB automatically sets root gap. ROBVON rings are beveled to assure non-restricted fluid flow.

TYPE CC Designed to allow quick easy alignment of pipe where the inside diameters are slightly out of round. The welder has the choice of "STRIKING OFF" the NUBS or leaving them intact to be melted into the weld mass of the first root pass.

TYPE C Designed for precise close tolerance fit-up. Type "C" NUBS automatically set root gap. The NUBS melt with the metal to give complete penetration and fusion.

Robvon also manufactures machined rings to customer's specifications
All fabricated solid machined rings x-rayed. Write for full information

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BACKING RING COMPANY

675 GARDEN STREET ELIZABETH, NEW JERSEY

MINIMUM MAINTENANCE, LONG LIFE ASSURED BY THESE HEAVY-DUTY "BUFFALO" FANS

"Buffalo" Type "BLH" Fan
For Classes III & IV Service

"Buffalo" Type "BL" Fan
For Classes I & II Service

The high performance characteristics of these two outstanding "Buffalo" Fans has resulted in their widespread use in the field of industrial air handling. In addition to offering peak-efficiency operation in their respective classes, both the "BL" and the "BLH" bring you a bonus economy factor of *maintenance reduced to an absolute minimum* throughout a long, productive life. This minimum maintenance factor is directly due to unusually rugged "Buffalo" construction features such as:

HOUSINGS — The heavy gauge sides and scroll are of all-welded construction. Heavy structural steel bracing provides housing stiffness and rigid bearing support. Flanged inlets and outlets give added support.

SHAFTS — Hot-rolled or forged shafts are ground to close tolerances for perfect wheel and bearing fit.

WHEELS — Sturdy backward-curved blades are welded to the die-formed shroud and welded or riveted to the solid backplate. Heavy hubs assure permanent shaft alignment. For higher tip speeds, reinforcing rings provide necessary wheel rigidity.

BEARINGS — Self-aligning anti-friction bearings are designed for continuous operation at maximum tip speed. Horizontally split, ring-oiled, self-aligning, babbitted sleeve bearings are also available.

For full details, contact your "Buffalo" representative, or write for Bulletins F-102 and F-200.

Minimum maintenance is assured by the famous "Q" Factor — the built-in QUALITY that provides trouble-free satisfaction and long life in every "Buffalo" product.

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BUFFALO FORGE COMPANY
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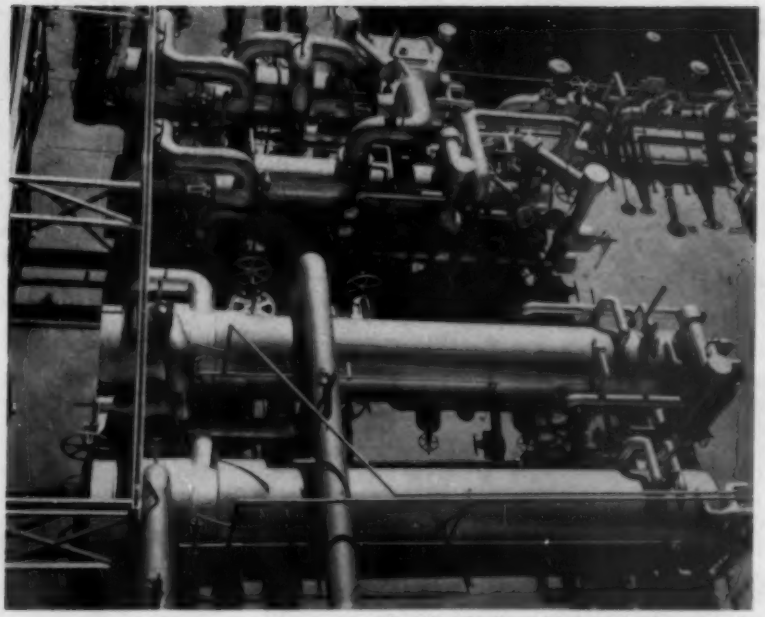
BUFFALO PUMPS DIVISION, BUFFALO, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING



Consulting Engineers, Ebasco Services Incorporated

The modern, efficient equipment shown here was designed and built by the Yuba Heat Transfer Division for the Collin Station of the Texas Power & Light Co. Serving a 110,000 KW turbine are five Yuba feedwater heaters, of which four are shown here. Two high-pressure heaters are designed for 2600 psi on the tube side with 6500 and 6750 sq. ft. of surface. Three low-pressure heaters are designed for 400 psi on the tube side and have 2850, 3165 and 4670 sq. ft. of surface.

Yuba designed and built the first all-welded feedwater heaters, in service for the last year and a half. The weld technique was used in the tube bundles, shells and Multilok Closures. These all-weld heaters have been so successful they have started an industry trend.

In the manufacture of condensers, Yuba is building units having 165,000 sq. ft. of total surface. The designs are readily adapted to condensers of even greater capacity as required for larger turbines.

Yuba evaporators have achieved boiler make-up water purity of less than .2 ppm. Yuba can *guarantee* purity of .25 ppm solids content per 3000 ppm shell concentration.

Engineering accomplishments such as these keep the power industry up-to-date. There's progress in power through progress in heat transfer equipment.

YUBA

EQUIPMENT will still be UP-TO-DATE TOMORROW because IT'S AHEAD TODAY

Twin-unit surface condenser has 90,000 sq. ft. of surface. Operates at 26.52 inches of vacuum with oxygen content in the condensate less than 0.01 cc per liter.

Bubble-tray evaporator produces 34,000 lb./hr. of vapor well below 1.0 ppm total solids with 3000 ppm concentration.

YUBA HEAT TRANSFER DIVISION

HONESDALE, PENNSYLVANIA
NEW YORK SALES OFFICE: 530 FIFTH AVENUE
REPRESENTATIVES IN PRINCIPAL CITIES

Other Yuba Divisions
Adsco Division, Buffalo, N. Y.
California Steel Products Division, Richmond, Calif.
Yuba Manufacturing Division, Benicia, Calif.

YUBA

STEAM SURFACE CONDENSERS
EVAPORATORS
STEAM JET REFRIGERATION
STEAM JET AIR EJECTORS
FEEDWATER HEATERS
BAROMETRIC CONDENSERS

YUBA CONSOLIDATED INDUSTRIES, INC.

Richardson Scale — South & Southwest

Richardson Scale Company has announced the appointment of **Howard Johnson** as Southern Regional Manager, with headquarters at 423 Grant Building, Atlanta 3, Georgia.

Howard Johnson

Mr. Johnson replaces **Ernest C. Mott**, who is retiring after 39 years with the company. In his new position, Mr. Johnson will be in complete charge of Richardson operations in the South from North Carolina to Texas. Before assuming his new duties, he spent seven years as Richardson's Wichita Manager where he both sold and serviced Richardson products.

FWS&M Appoints District Managers

Fort Worth Steel & Machinery Company, Fort Worth, Texas, has recently appointed three new district managers:

H. L. (Hal) Chern, Baltimore district (1605 Court Square Building). Chern previously served as branch manager for Howe Scale Company both in Cincinnati and Hartford.

C. A. (Bud) Martin, Jr., West Texas district (3600 McCart Street, Fort Worth). Martin previously was a customer service engineer for FWS&M, since early 1957.

Norman E. Schmidt, St. Louis district (2212 Olive Street). Schmidt formerly was Chicago district manager for Howard Industries, Inc., manufacturer of electric motors. He also is a former plant manager of F. L. Jacobs Co., Traverse City, Mich.

Southern Appointments by Allis-Chalmers Mfg.

Newly assigned to sales posts for Allis-Chalmers are **James C. Barnett**, Dallas, Texas district office; and **Dale Stephenson**, power plant equipment representative in the Southwest region, which has its headquarters in Dallas.

Braid Electric Company, 1100 Demonbreun Viaduct, Nashville, Tennessee has been named an agency for Allis-Chalmers regulators. **Ben Gambill** is president and **Ferrell Gregory**, sales manager of Braid Electric, which has been an Allis-Chalmers transformer distributor since 1945.

The Lighting Fixture & Electric Supply Company, 307 Tchoupitoulas St., New Orleans, has been appointed a distributor for transformers in the New Orleans trading area. **Charles G. Justice, Jr.**, is president and **John Aertker, Jr.**, sales manager.

The Electric Supply and Equipment Company, Inc., 1812 East Wendover Avenue, Greensboro, N. C., has been named an agency for feeder voltage regulators, power transformers, unit substations, switchgear, and circuit breakers. The company is headed by **P. R. Fogleman.**

Sies Electric Supply Company, 734 East Eleventh Street, Chattanooga, Tenn., has been appointed an agent for regulators. **L. D. Sies** is president.

The L. R. Reams Supply Company, East Cumberland at 13th Street, Middlesboro, Kentucky, has been named a distributor for Allis-Chalmers motors, control and "Texrope" V-belt drive equipment. The firm was established in 1948 and is headed by **L. R. Reams.**

Farr Company Expands Engineering Service

Farr Company, Los Angeles, has increased the field engineering service for air filters by adding four new representatives. **Brownlee-Morrow Company** will serve the Alabama territory while **Earl W. Siebert** will cover Northern Florida and Southern Georgia. **Robert S. Belcher** is the firm's representative for Central Florida; **G. H. Avery Co.** in Arkansas.

N.S.P.E. Officers

Dr. Clark A. Dunn, administrative head of the School of General Engineering at Oklahoma State University has been nominated for the office of president of the National Society of Professional Engineers.

Regional vice presidents include **John B. McGaughy**, partner in the firm of Lublin, McGaughy and Associates, architects and consulting engineers in Norfolk and Washington, D. C.; and **Noah E. Hull**, assistant to the vice president for manufacturing of the Hughes Tool Company of Houston, Texas.

Russell B. Allen, nominated for an 11th term as treasurer, is assistant dean of engineering at the University of Maryland, College Park, Md.

P. H. Nichols & Co. — Go.

Ronny J. Peterson has joined **P. H. Nichols & Co.** as Sales Engineer covering **Georgia, Florida** and Eastern **Tennessee.** He will work out of the headquarters at 603 Whitehead Building, Atlanta, Ga. Mr. Peterson has covered the same area previous to joining the Nichols organization. He is a mechanical engineer and attended Georgia Tech.

E. D. Nichols, previously in the Atlanta office, has been placed in charge of the Charlotte, N. C. office covering **Virginia, North Carolina** and **South Carolina.**

P. H. Nichols & Co. represents Riley Stoker Corp., Schutte & Koerting Co., Swartwout Co., Pittsburgh Piping & Equipment Co., Chicago Heater Co., and The Williams Gauge Co.

(*Continued on Page 98*)

Don't wait for production to force electrical expansion

POWER-UP to provide electrical capacity that grows at lower cost

As more machines are added and additional power is required, electrical distribution systems must be able to handle the load. If *your* system is questionable—as 65% of all plants are—*you* need to start a program to POWER-UP . . .

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YOU CAN BE SURE...IF IT'S Westinghouse

Here's how a

POWER-UP

program

assures

electrical

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for today

and tomorrow

When you modernize your plant for lower costs, power consumption will increase. It may be six months — or six years — before you do it, but you shouldn't have to replace your electrical distribution system.

That's why it is important that you call on Westinghouse now for POWER-UP planning assistance and work-together equipment. Industry-experienced engineers will help you get full capacity today — plus a growth design for tomorrow.

A MODERN WESTINGHOUSE DISTRIBUTION SYSTEM brings advantages of convenient arrangement, easy maintenance and provisions for load growth. There's profit in planned power — call your Westinghouse salesman. Or, write Westinghouse Electric Corporation, 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Pennsylvania.

J-96103

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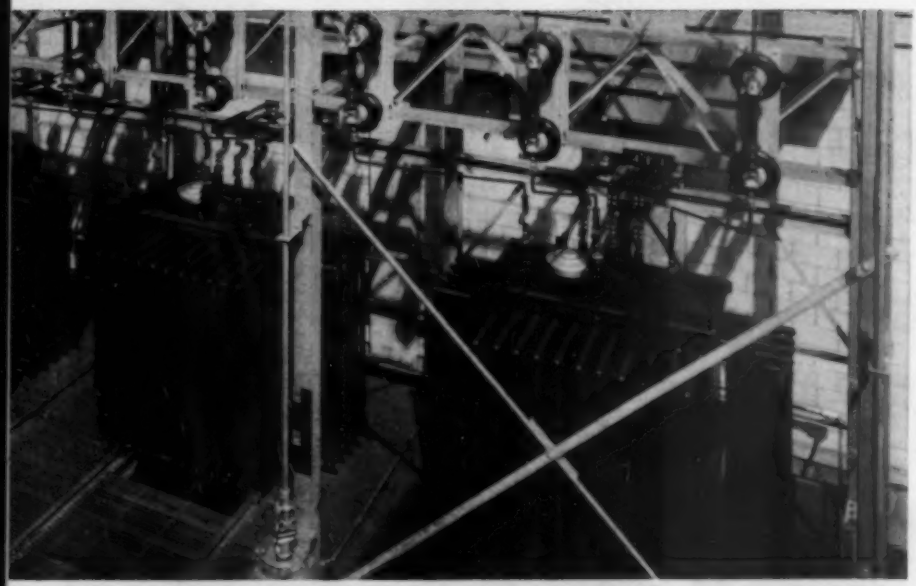
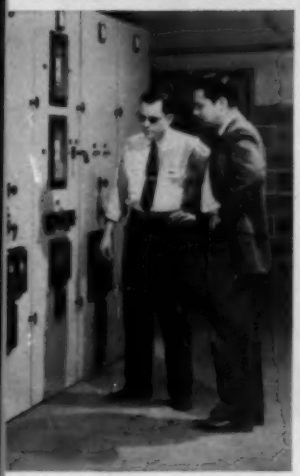
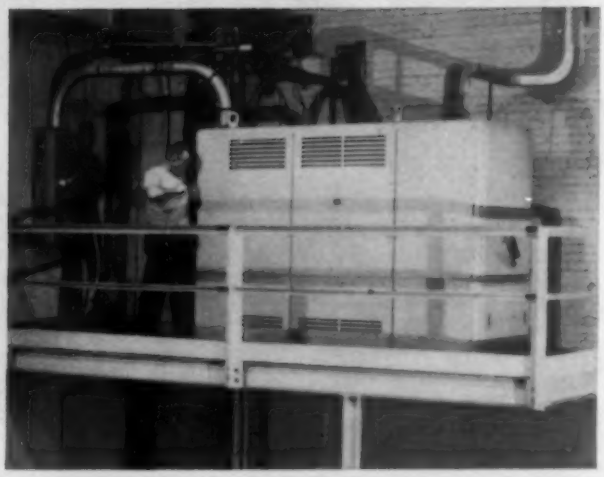
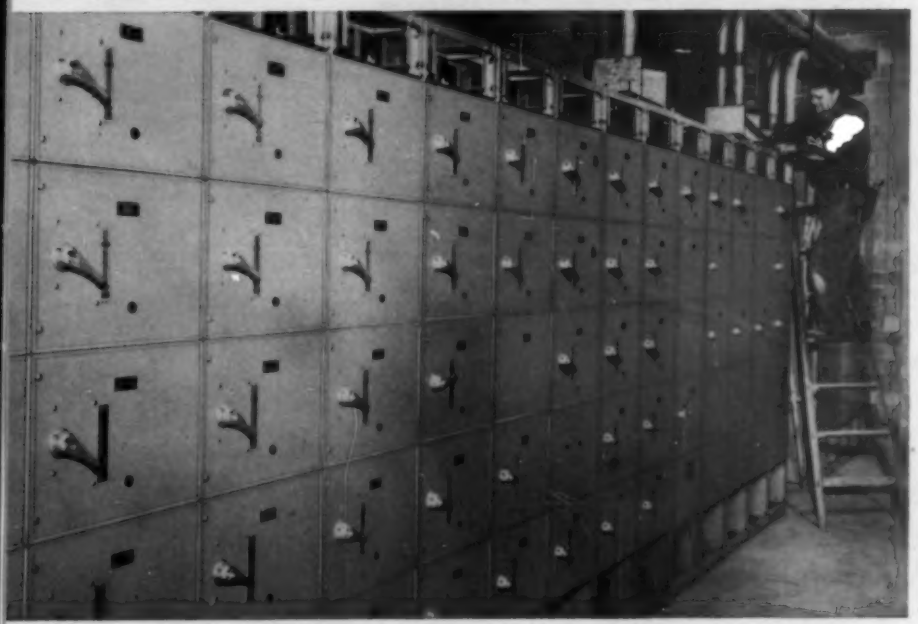
Westinghouse







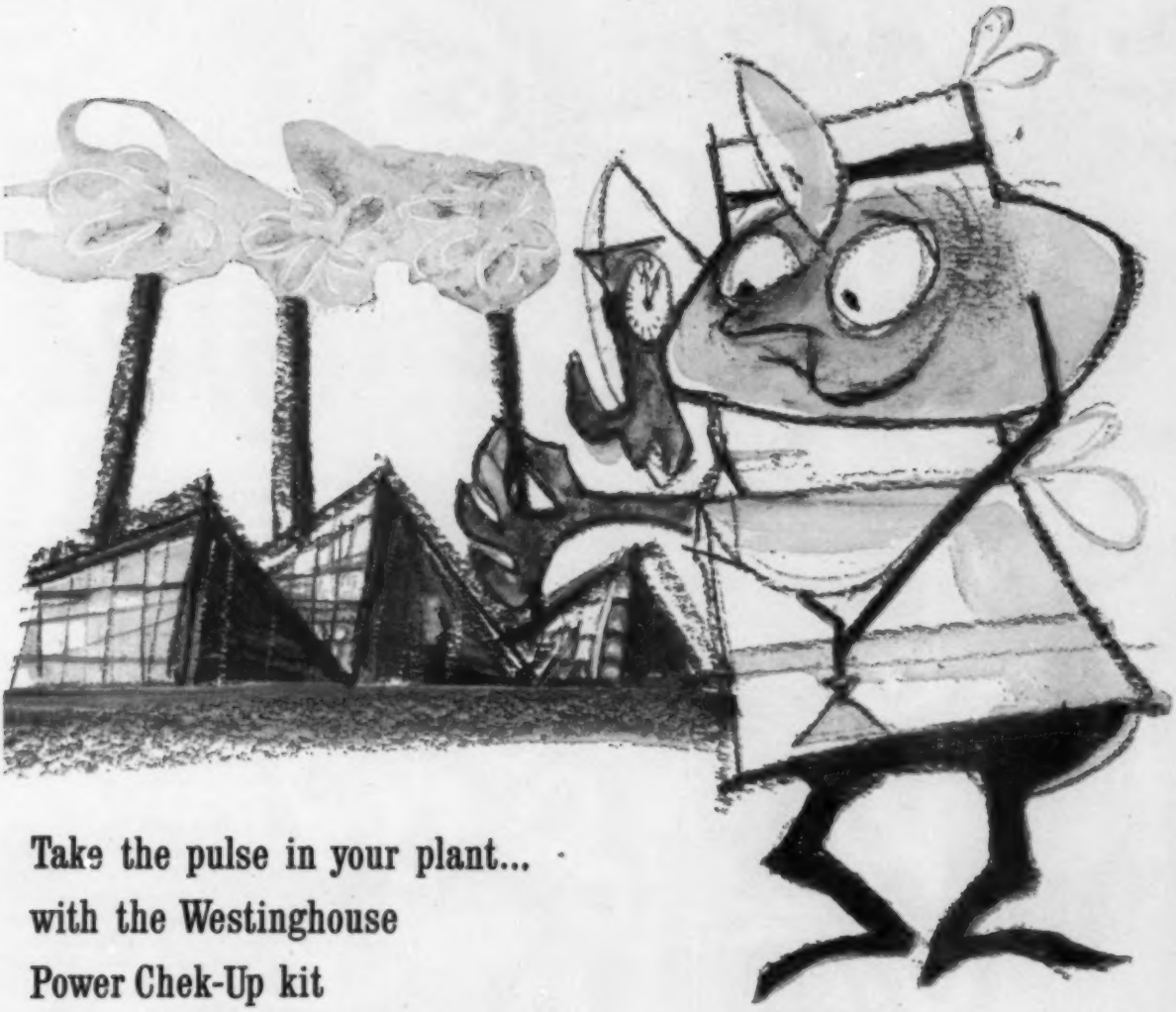


Westinghouse Outdoor Substation Design means savings right from the start with just one source of responsibility. Later expansions are simple when additional transformer capacity is added to meet the increasing demands. Units are protected from weather, yet are easily accessible for maintenance.

Westinghouse Standardized Metal-Clad Switchgear provides superior circuit protection with Type DH air circuit breaker to accomplish fast and positive arc interruption. Centralized circuit control and protection are afforded for generators, motors, bus and feeder up to 13.8 kv.

Westinghouse Power Centers, located at the load, are geared for today's production with growth flexibility for tomorrow's requirements. Dry-type self-contained power centers eliminate fire hazard. Location close to load shortens secondaries, reduces line loss, gets more work from motors. Units are 20-40% lighter than liquid-filled . . . suitable for easy balcony mounting.

Westinghouse Control Centers, proved industry's safest through testing under maximum fault conditions, offer these outstanding design features: interchangeable 9½- and 14-inch modular units, front accessibility for easy inspection, tilt-out lock-out positioning, each starter baffled to prevent spread of fault, heavy-gauge metal construction. Units reduce installation costs substantially.

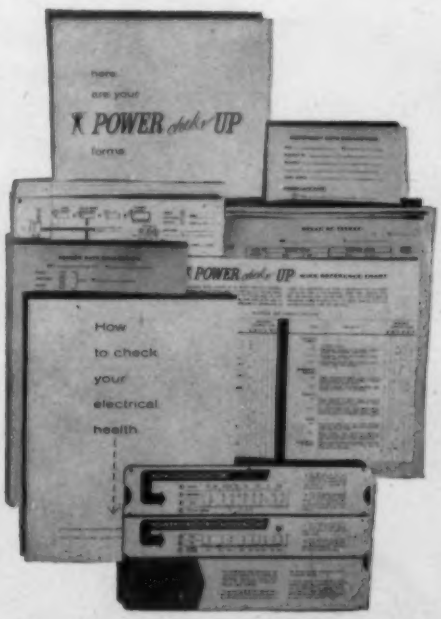


Take the pulse in your plant... with the Westinghouse Power Chek-Up kit

Production problems because of low voltage? Interrupted service? Maintenance costs too high? . . . Then your plant needs an electrical check-up . . . 65% of all plants do! It's easy to see where electrical inadequacy is costing you money when you use the new Westinghouse Power Chek-Up Kit.

The necessary forms, an easy-to-work slide rule and an instruction book are all included. Ask your utility or Westinghouse salesman for details on how to get a kit.

J-96120



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BF-23

Coal scores

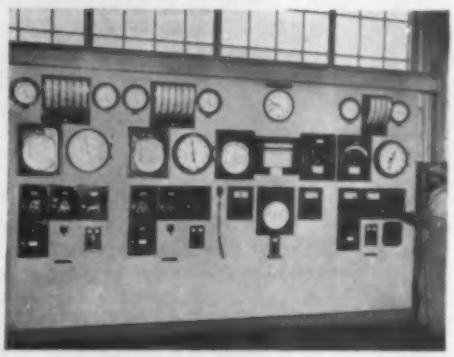
with Notre Dame

University power plant burns coal for modern steam generation

Enrollment growth and building expansion had put a strain on the power plant at the University of Notre Dame, South Bend, Ind. After careful study—by the consulting firm of Albert Kahn Associated Architects and Engineers, of Detroit—a decision was made to modernize steam facilities and add power generating equipment. Two new coal-fired boilers, a turbo-generator and auxiliary equipment were installed.

Maximum efficiency is achieved through automatic combustion control and complete instrumentation. Today steam is generated *economically.* Another noteworthy result of these innovations has been the *cleanliness* of operation . . . making Notre Dame's power plant a model of good housekeeping.

Firing aisle shows both Union Iron Works boilers . . . identical 2-drum, bent-tube type with a normal rating of 70,000 lb/hr. These units are fired by Detroit Rotograte Spreader Stokers.



All combustion controls and instruments are centered in this control panel by Hays Corp.

Furnace ash and dust from Prat-Daniel Collectors are conveyed pneumatically to this 50-ton ash storage silo. Rotary dustless unloader assures clean removal of material. Ash-handling system is by United Conveyor Corp.

Facts you should know about coal

You'll find that bituminous coal is not only the lowest-cost fuel in most industrial areas but up-to-date coal burning equipment can give you 15% to 50% more steam per dollar. Today's automatic equipment can pare labor costs and eliminate smoke problems. And vast coal reserves plus mechanized production methods mean a constantly plentiful supply of coal at stable prices.

Technical advisory service

To help you with industrial fuel problems the Bituminous Coal Institute offers a free technical advisory service. We welcome the opportunity to work with you, your consulting engineers and architects. If you are concerned with steam costs, write to the address below. Or send coupon below for our case history booklet, complete with data sheets. You'll find it informative.

Consult an engineering firm

If you are remodeling or building new heating or power facilities, it will pay you to consult a qualified engineering firm. Such concerns—familiar with the latest in fuel costs and equipment—can effect great savings for you in efficiency and fuel economy over the years.

BITUMINOUS COAL INSTITUTE

Department SP-05

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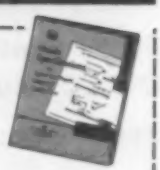

SEND COUPON FOR YOUR COPY OF "Guide Specifications for Typical Low-Pressure Commercial Heating Plant." This booklet, adaptable for design loads 3,000 to 24,000 EDR steam, contains specifications, drawings and tables on all aspects of a typical heating plant. SP-05

☐ Guide Specifications Booklet ☐ Case histories on larger plants

Name_____

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TIMELY COMMENTS

12th Annual PLANT MAINTENANCE ISSUE

"THERE is nothing new under the sun" was never a true statement, and is particularly untrue as applied to maintenance.

Even conventional equipment is capable of developing new combinations of ailments that try the "trouble shooter's" soul. But add to that the need to become acquainted with new devices, and new supplies — while at the same time trying to hold the cost down and production up, in the face of inflation — and the maintenance engineer's job equals that of any executive in its demand for ingenuity.

Normally SPI (including this special maintenance issue) limits its coverage to proven practical procedures — and that's how it should be. But what's commonplace to one engineer is novel to another. So the stock of information presented here is sufficiently ample in volume and variety to provide food for thought to practically all SPI readers. We believe nearly every reader will find at least a few ideas that can improve his plant performance.

But for those that want to look to the future — the following serious item gives the most advanced theory on power generation. Perhaps the M.I.T. professors have the answer — or it may be something else. But almost certainly we will eventually get electricity without using a mechanical power unit to turn a generator.

From Heat . . . DIRECT to Electricity

ONE OF OUR GREATEST NEEDS is an engine which will convert atomic heat directly into electricity. And two professors at the Massachusetts Institute of Technology now believe they have invented such an engine.

The new device, a thermo-electron engine which operates without any moving mechanical parts, is based on the principle that if two metal plates are placed side by side and one is made hotter than the other, electrons jump from the hot plate to the cold plate. They form a stream of electricity which can be used for any electrical purpose.

Thus far, the process has been conducted only inside a large vacuum tube, but the inventors have applied for a patent on the device and they believe it will become practical for many uses.

A kind of heat engine that uses an electron gas instead of steam, the invention has been under development over the past five years by George N. Hatsopoulos, assistant professor, and Joseph Kaye, professor of mechanical engineering at M.I.T. Their latest working model is based on a scientific report which was published by Professor Hatsopoulos in 1956 and which, he believes, was the first detailed study of such an engine ever made.

Heat Engine . . . No Moving Parts

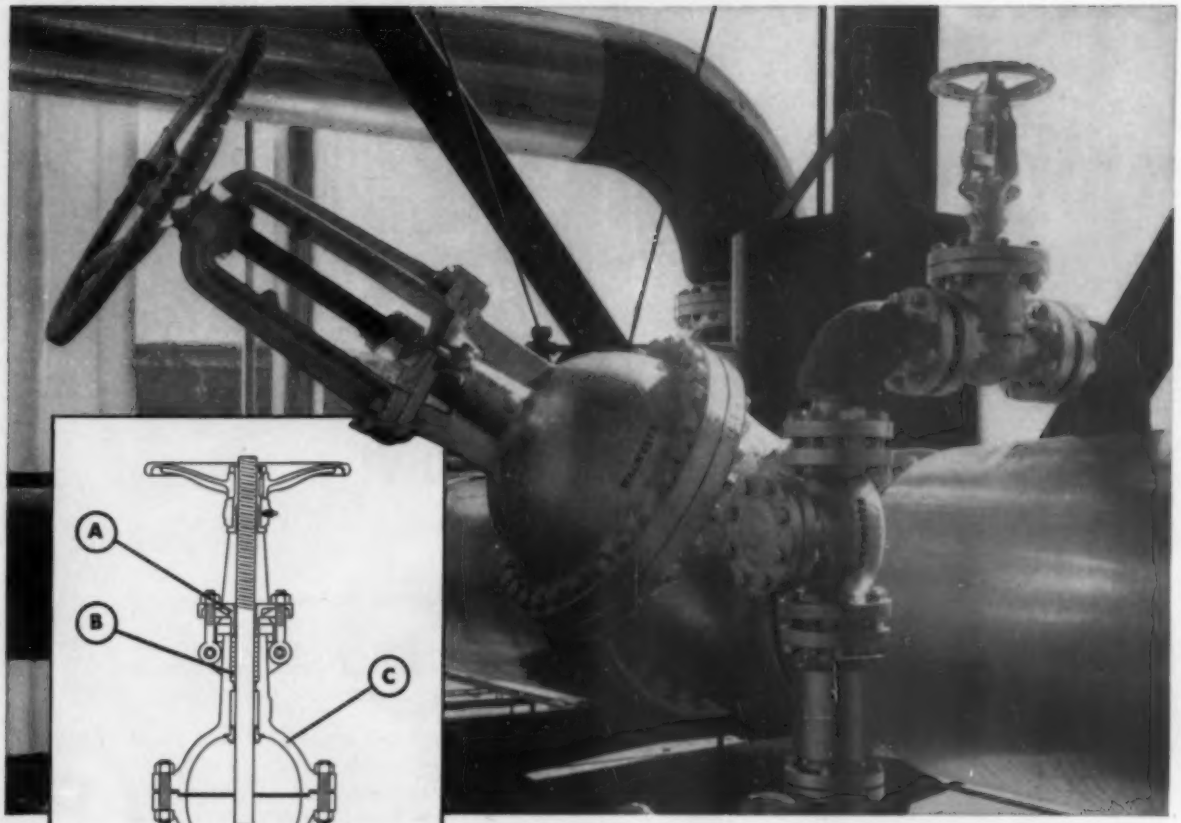
Because it uses no moving components to convert heat to electricity, a device of this kind should be virtually maintenance-free. Whenever size and weight are a consideration — as they are in missiles and satellites — it will have significant advantages over conventional systems. And on the basis of efficiency alone, it should be more than competitive in the small power plant field.

"Now that we have a working model," says Professor Kaye, "it appears that a relatively simple electron heat engine can be built using ordinary fuels, nuclear fuels, or solar energy. And isotope heating is a very promising possibility for the near future."

Isotopes which are made radioactive, or charged up as it were, in a nuclear reactor give back this energy in the form of heat. Since some of these radioactive isotopes have a long life, they could be used as a heat source for a thermo-electron engine.

Basically the electronic heat engine consists of two metallic plates (one relatively hot and

(*Continued on Page* 52)



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(E) STURDY SEAT RINGS: Bottom-seated so that no recess exists at the back of the ring to cause turbulence, erosion and pressure drop.

(F) STREAMLINED PORTS: Permit unobstructed flow which results in minimum pressure drop and reduces the possibility of erosion.

Walworth Cast Steel Gate Valves can be furnished with either flanged ends or butt welding ends. Roller bearing yokes are available on the larger sizes. On valves 4 inches and larger, by-passes can be furnished. Walworth Cast Steel Gate, Globe and Check Valves from Series 150 to 2500, are available. For Series 600 and higher, we recommend Walworth Pressure Seal Cast Steel Valves. See your Walworth Distributor or write to Walworth for complete information.

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INDUSTRY SPEAKS

The Time for Better Maintenance is NOW!

A booming economy with maintenance of machines creating a vastly expanded source of new jobs was foreseen by C. E. Sutton, manager of marketing for General Electric's Service Shop Department, speaking recently before the Technical Association of Pulp and Paper Industries, Virginia-Carolina Section.

MR. SUTTON emphasized that machines making up a mechanized production line today or an automated line tomorrow are in reality dumb animals that require care and maintenance which can only be supplied by human hands and brains.

The next two-to-10-year period, he said, will see a further rise in take-home pay, more new products and markets, and a substantial increase in the population. All of these factors, he said, will make for a more dynamic economy, producing more goods for more people.

"The total effect of more people with more dollars wanting more products," he pointed out, "presents industrial management with many challenging problems to produce the goods required.

Increased mechanization and electrification of production, he said, have become industry's answer to this problem. "Machines will be larger and more complicated. Factory production lines will have the output of one machine feeding the input of the next."

Dynamic growth factors, he explained, create an urgency for the development of effective maintenance programs throughout American industry.

But he cautioned that plant management must give greater attention to maintenance.

"Proper maintenance should not be considered as a separate expense item," he said, "but rather as an item of production cost along with raw material and direct labor. Effectiveness of a maintenance program can mean the difference between profit and loss in a plant's operation." He declared that in a highly automated plant even a five-day, unscheduled shutdown due to equipment failure could prove disastrous.

The present period of slack production, he said, could prove an ideal time for industry to plan and execute "a soundly engineered program of productive maintenance."

Mr. Sutton defined productive maintenance as a "carefully engineered maintenance program, tailored to a particular plant and designed to keep unscheduled downtime to a minimum so that optimum production and profit may be realized from the investment in plant tools and equipment."

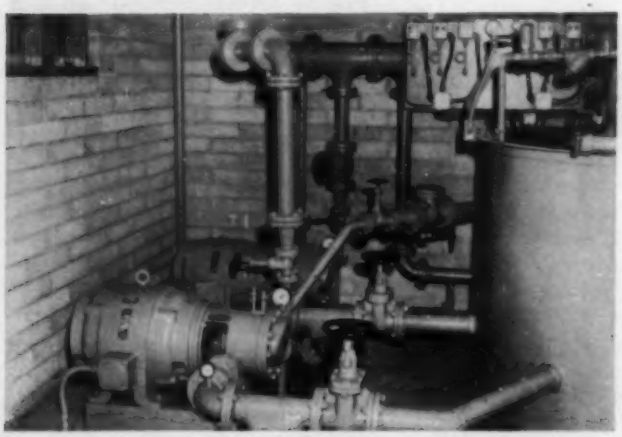
He proposed that plant management upgrade the man responsible for maintenance to the same level as that set for heads of engineering, purchasing, manufacturing or marketing. The maintenance chief, he added, will be directing a greatly increased highly skilled labor force.

Check plant-tested maintenance methods starting page 36

A hippo surfaces with a cavernous yawn—powered by water from F-M pumps shown below.

From butterflies to hippopotami

F-M pumps make animals "live"



In one of the world's most fabulous amusement parks, waterfalls tumble; rivers flow; hippos yawn, and giant butterflies flap their wings—all water-powered by Fairbanks-Morse pumps with F-M motors.

Although a most unusual application, these F-M installations demonstrate the flexibility and experience of Fairbanks-Morse in working with the engineers of any organization.

Whatever type, size or capacity pumps you need—you're sure of satisfaction when you call in your F-M Sales Engineer. Contact him today, or write directly to Fairbanks, Morse & Co., 600 South Michigan Avenue, Chicago 5, Illinois, Dept. SPI-5.

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How Chemstrand's Decatur, Alabama Plant

By PAUL TAYLOR, Senior Supervising Engineer,
Area Engineering and Maintenance, The Chemstrand Corporation

CHEMSTRAND'S Plant Engineering Department performs maintenance and minor project work for all of the Decatur, Alabama "Acrilan" producing facilities. The maintenance organization, part of the Plant Engineering Department, features a combination area and central shops set-up.

Here, Mr. Taylor highlights one of several programs either completed or in progress to continually improve engineering and maintenance. Before joining Chemstrand he had more than five years experience as an instrument engineer for E. I. du Pont de Nemours & Co., Inc. and Union-Camp Paper Corporation.

EARLY in 1957 Chemstrand's Acrilan Plant personnel at Decatur, Alabama altered and formalized their maintenance work order procedures in order to improve over-all maintenance functions. Production and maintenance benefits are tabulated on the opposite page.

To fully appreciate the new work order procedures, a brief consideration of Chemstrand's Decatur facilities and maintenance organization is necessary.

The Chemstrand Corporation's "Arcilan" Manufacturing facilities, Research facilities, and Corporation offices are all located at the Decatur site. "Acrilan," Chemstrand's acrylic chemical textile fiber, is manufactured in a modern plant which is predominately a chemical process operation. However, it does include a significant amount of mechanical operations in processing the final product, "Acrilan" staple fiber. The Plant Engineering Department performs maintenance and minor project work for all these facilities.

The maintenance organization, which is a part of the Plant Engineering Department, features a combination area and central shops set-up. There are four area maintenance groups each with a capability of performing machinery maintenance, piping repairs, routine preventive maintenance functions and a small amount of scheduled minor project work. Most mechanic skills such as pipefitting, painting, carpentry, insulating, electrical, instrumentation, sheetmetal, etc., are available in the maintenance organization. Present manpower totals about 185 mechanics, 16 foremen, 2 general foremen, and 4 planning and scheduling personnel.

Engineering requirements for the maintenance functions are handled by staff area and instrument engineers.

It should be noted that Chemstrand's Decatur maintenance group handles three basically different types of jobs, these being capital addition jobs, major maintenance expense jobs (each $1,000 or over), and minor maintenance expense jobs (under $1,000 each). The new work order procedures described in this article are only those related to the minor maintenance expense jobs. There were no changes made in their work order procedures for capital addition or major maintenance expense jobs.

Chemstrand defines four different types of maintenance expense work and identifies these different types of work with a work order prefix digit as follows:

Alterations — Work Order Class 4; Typical Work Order No. 4-2345.

Example — Expense jobs that involve change in equipment due to process change, modifications that increase efficiency but not value of machinery, and alterations to conform to certain safety requirements.

Experimental and Development — Work Order Class 5; Typical Work Order No. 5-2345.

Example — Expense jobs of experimental and development nature under the direction of Process Development Group and Research.

Repairs and Maintenance — Work Order Class 6; Typical Work Order No. 6-2345.

Example — Routine standing maintenance work orders and major repairs to machinery, equipment and building.

Other Charges — Work Order Class 7; Typical Work Order No. 7-2345.

Example — Shops overhead, material handling, certain labor requirements and other expense jobs that cannot be properly classed in other groups.

Minor Order System

Annual Work Orders — Area engineers and Instrument engineers prepare annual work orders

Streamlined WORK ORDER PROCEDURES

Benefits of improved procedures . . .

1. Provided more accurate maintenance cost accounting information which shows distribution of maintenance expenses between alterations, development work, maintenance and/or repairs, and other maintenance expense work.

2. Provided more and better engineering and design information to field personnel who actually execute maintenance work.

3. Facilitated more effective planning and scheduling of maintenance work.

4. Provided supervisory and other personnel who request work a written copy of the request to assure follow-up and completion of the work.

of the appropriate class for the various accounting cost centers. These work orders set aside funds so that minor orders may be written against the annual work orders and charges can be accumulated against the proper category of work such as alterations, maintenance, development, etc.

Cost Limitation — Any Decatur maintenance expense work which does not exceed $1,000 in total cost for labor and material can be accomplished by use of a minor order. This work may be performed by either plant mechanical forces or outside contractor. Individual jobs which exceed $1,000 are handled through use of a Plant Engineering Work Request. Minor orders are written on standard printed forms, consisting of an original and two duplicate copies which are pre-numbered. A typical minor order form is shown in figure 1.

Minor Order Sketch Pads Availability — Minor orders written against class 4, 5, and 7 annual work orders require the preparation of a sketch showing the requested work. These sketches are made on 8½" x 11" tracing paper. The desired type of sketch pads, are stocked in the Plant Engineering Drafting Section.

Minor Order Originators—Minor orders are written by the supervisor (or his delegated alternate) who is responsible for charges against the various Decatur accounting cost centers. Minor orders affecting process operations or changes must be initialled by both the appropriate area supervisor and area technical representative.

Use of Plant Engineering Work Order in Lieu of Minor Order — The minor order system does not preclude the use of a Plant Engineering Work Order when this is desirable for accounting or other purposes. For example, it may be desirable to accumulate charges separately for a maintenance job that was not anticipated in the preparation of annual maintenance work orders, even though the cost of the job is less than $1,000. In these special cases, the work is handled through the use of a Plant Engineering Work Request.

Obtaining Minor Order or Repair (Class 6)

Note that this procedure applies only to maintenance and repair of existing equipment or simple replacement of worn or damaged equipment. It does not apply to replacement with a different type, i.e., a design change, or to alterations, developments, etc., of equipment.

(a) *Normal Maintenance or Repair* — Normal maintenance and repair work such as painting, re-

Any maintenance expense work which does not exceed $1,000 in total cost for labor and material can be accomplished with this minor order form.

Part of the Chemstrand maintenance department shops.

placement of light bulbs, stopping leaks, and all other such work that can be scheduled is accomplished through the use of a minor order.

Originator

The minor order originator for this type of maintenance work does the following:

1. Prepares a minor order showing department number, date, estimated cost of job, date required, class 6 work order number, complete description of work, and originator's name. The originator may consult his area engineer or instrument engineer for assistance in estimating cost. The class 6 work order number is obtained from a current list of annual work orders issued by the Plant Engineering Department.
2. Forwards the original and one copy of the minor order to the maintenance section planning and scheduling supervisor or to the Instrument foreman if instrument work is requested. No sketch is required with a maintenance or repair (Class 6) minor order.
3. Retains one copy of the minor order to be used for follow-up of the requested work.

Planning and Scheduling

Upon receipt of the minor order, the Planning and Scheduling Section (or Instrument Section) does the following:

1. Reviews stores stocks to determine that all material for job is available. Requisitions and purchases replacement parts if required.
2. In conjunction with Maintenance General Foremen, plans and schedules work. General Foremen execute work through Maintenance Foremen. Instrument work is scheduled and executed through the Instrument Foremen.
3. Following job completion, returns foreman's copy of closed-out minor order to the originator.

Area Engineer

The Instrument and Area Engineer review the minor orders from their areas daily to keep abreast of maintenance problems and note high maintenance items which may be corrected through engineering studies.

(b) *Routine or Preventive Maintenance — Process Areas* — Routine preventive maintenance is handled without the use of a minor order. This type of maintenance is carried out according to a preventive maintenance schedule which has been adopted by Production and Maintenance supervision. Revisions to this schedule are made by mutual agreement of Production and Maintenance supervision.

(c) *Emergency or Demand Maintenance — Process Areas* — Emergency or demand maintenance which requires immediate attention in order to prevent or minimize lost production is handled without the use of a minor order. Requests for this type of work are made to either of the Maintenance General Foremen or to the Instrument Foremen. During evening shifts requests are made to the shift senior mechanic who contacts appropriate maintenance supervision if he needs additional help.

Obtaining Minor Order Class 4, 5 & 7 Work

This procedure covers alterations, development, and other expense work of a minor nature. All of this type work requires the use of a minor order. Also, with the exception of Class 7 labor charges and purchases, the minor order must be accompanied by a sketch showing the request work.

PLANT ENGINEERING WORK PROCEDURES

Chart on the opposite page, issued by the Plant Engineering Department, has proved very effective in familiarizing Chemstrand personnel with standard work order procedures.

Originator

The minor order originator for this type of work does the following:

1. Prepares a minor order showing department number, date, estimated cost of job, date required, appropriate class work order number, complete description of work, and originator's name. The originator may consult his area engineer or instrument engineer for assistance in estimating cost. The correct work order number is obtained from a current list of annual work orders issued by the Plant Engineering Department.
2. Prepare a sketch on reproducible tracing paper (preferably 8½" by 11" Stock 450 from Plant

PLANT ENGINEERING WORK PROCEDURES

1. DETERMINE CATEGORY OF WORK (ONE SPECIFIC JOB) AND ESTIMATED COST. DISCUSS WITH AREA ENGINEER IF REQUIRED.
2. REFER TO TOP GRAPH- DETERMINE PROPER PROCEDURE .
3. REFER TO BOTTOM GRAPH - CARRY OUT INSTRUCTIONS-

CATEGORY	PURCHASE AND INSTALL ANY NEW ITEM: CAPITAL ADDITION (TAGGED)	DISMANTLE CAPITALIZED EQUIPMENT (TAGGED)	ALTERATION OF PLANT EQUIPMENT	EXPERIMENTAL OR DEVELOPMENT WORK	MAINTENANCE AND REPAIR (PERFORMED BY SHOP MECHANICS)	MAINTENANCE AND REPAIR (PERFORMED BY SHIFT MECHANICS)	PURCHASE MAINT. MATERIALS OR REQUISITION FROM STORES. (NOT OPERATING SUPPLIES)	MATERIAL HANDLING, INSTALL TEMPORARY FACILITIES OR MAINTENANCE FABRICATION. WORK BY LABOR GROUP, OTHER CHARGES.
ESTIMATED COST OF WORK $25M	USE PROCEDURE NO. 5	USE PROCEDURE NO. 5	USE PROCEDURE NO. 5	USE PROCEDURE NO. 5	USE PROCEDURE NO. 1	USE PROCEDURE NO. 1	USE PROCEDURE NO. 5	USE PROCEDURE NO. 5
1M	USE PROCEDURE NO. 2	USE PROCEDURE NO. 1	USE PROCEDURE NO. 2	USE PROCEDURE NO. 2			USE PROCEDURE NO. 1	USE PROCEDURE *NO. 2 (WITH SKETCH) NO. 1 (WITHOUT)
			USE PROCEDURE NO. 4	USE PROCEDURE NO. 4	USE PROCEDURE NO. 6	USE PROCEDURE NO. 7	USE PROCEDURE *NO. 4 (WITH SKETCH) NO. 3 (WITHOUT)	USE PROCEDURE *NO. 4 (WITH SKETCH) NO. 6 (WITHOUT)
100	EXPENSE PURCHASE- NON MAINTENANCE ITEMS: SEE REVERSE SIDE							
0								

*SKETCH IS NOT REQUIRED FOR STRAIGHT PURCHASER, MATERIAL MOVEMENTS, LABOR CHARGES, ETC.

	PROCEDURE NO. 1	PROCEDURE NO. 2	PROCEDURE NO. 3	PROCEDURE NO. 4	PROCEDURE NO. 5	PROCEDURE NO. 6	PROCEDURE NO. 7
ORIGINATOR	1. PREPARE PLANT ENGINEERING WORK REQUEST. 2. FORWARD TO PLANT ENGINEER.	1. PREPARE PLT. ENG. WORK REQUEST. 2. PREPARE SKETCH OF PROPOSED WORK. 3. FORWARD TO PLANT ENGINEER.	1. PREPARE M/O. 2. FORWARD TO AREA ENGINEER.	1. PREPARE M/O. 2. PREPARE SKETCH OF PROPOSED WORK. 3. FORWARD TO AREA ENGINEER.	1. PREPARE ENGINEERING DIVISION WORK REQUEST. 2. FORWARD TO DIRECTOR OF ENGINEERING.	1. PREPARE M/O. 2. FORWARD TO MAINTENANCE DEPT.	1. CONTACT AREA MECHANIC FOREMAN. 2. GIVE INSTRUCTIONS.
AREA ENG.	1. PREPARE ESTIMATE AND PAR. 2. PREPARE W/O AND DRAWINGS, ORDER MATERIAL. 3. FORWARD W/O AND DRAWINGS TO MAINTENANCE. 4. PROVIDE ENGINEERING ASSISTANCE IF REQUIRED.		1. CHECK ENGINEERING SOUNDNESS OF PROPOSAL. 2. COMPLETE ENGINEERING AND DESIGN IF REQUIRED. 3. INDICATE "PROCESS" OR "NON-PROCESS". 4. ORDER MATERIALS. 5. FORWARD TO MAINTENANCE DEPARTMENT.		REFER TO ENGINEERING DIVISION PROCEDURES.	REVIEW MINOR ORDERS FOR APPROPRIATE AREA ONCE PER DAY	AIDS IN ESTABLISHING PERIODIC MASTER MAINTENANCE SCHEDULES.
MAINT. DEPT.	1. PLAN, SCHEDULE, AND EXECUTE WORK.					1. PURCHASE MATERIALS. 2. SCHEDULE AND EXECUTE.	1. MAKES APPROPRIATE CHARGES FOR LABOR AND MATERIAL.

Maintenance Procedures at Chemstrand — Contd.

Engineering Department Drafting Section) showing in adequate detail what is requested. The originator may consult his area engineer or instrument engineer regarding details of the sketch. (Note: In the case of a Class 7 work order requesting only a purchase, the preparation of a sketch is not required.)

3. In cases where the work requested may affect process operations or equipment, has the minor order initialled by both area manufacturing supervision and technical representative.
4. Forwards the original and one copy of the minor order along with the reproducible sketch to the appropriate area engineer or instrument engineer.
5. Retains one copy of the minor order for use in follow-up of the requested work.

Area Engineer or Instrument Engineer

Upon receipt of the minor order and sketch the area engineer or instrument engineer does the following:

1. Reviews minor order work requested from an economic and engineering standpoint to insure that the request is feasible. Considers (1) return on investment (2) ease of maintenance and/or safety features, etc.
2. Reviews sketch to insure that it is complete in engineering detail. Before transmitting to field, the sketch must fully describe the requested work.
3. Reviews stores stocks to determine what equipment will have to be purchased. Purchases all equipment to execute job. When equipment is requisitioned, the area engineer shows the Planning and Scheduling Supervisor (or the Instrument foreman) as the purchase requisition originator. By doing this, purchase orders and receiving records will be sent to the Planning and Scheduling Section to facilitate their scheduling of the work. Follow-up on material procurement is then handled by Planning and Scheduling.
4. Prepares a pencil copy of the bill of material showing source of all materials to carry out the requested work.
5. Forwards minor order and one copy, sketch, and pencil copy of bill of materials to Planning and Scheduling Section.
6. On any job that will change or in any way affect process operations, arranges with the Technical Section representative for test coverage of equipment start-up.

Planning and Scheduling

Upon receipt of the minor order, the Planning and Scheduling Section (or the Instrument foreman) does the following:

1. Accumulates purchase orders and receiving records and checks these against the bill of material to determine when all material is available to carry out the requested work.
2. In conjunction with Maintenance General Foremen, plans and schedules work. General foremen execute work through Maintenance Foremen. Instrument work is scheduled and executed through the Instrument Foreman.
3. Following job completion, returns foreman's copy of closed-out minor order to the originator.

In conjunction with adoption of the procedures outlined above, the Plant Engineering Department issued a summary chart (illustrated) which briefly describes all work order procedures. This chart has proved to be a very effective way of familiarizing Chemstrand personnel with work order procedures.

The information presented illustrates one of the several programs either completed or in progress to continually improve engineering and maintenance in Chemstrand's Plant Engineering Department. Other improvement activities include establishing formal preventive maintenance schedules, organization of a planning and scheduling section, and establishing a formal mechanic training program.

The Chemstrand Plant Engineering Department believes that it must be a dynamic organization, continually keeping abreast of new developments and techniques in order to operate at maximum efficiency and provide the best possible maintenance service.

Air Tool Speeds Loom Maintenance

IN MAINTENANCE of front box plates for Draper looms, a workman must remove and replace two No. 6 screws holding a 3/16" leather strip on the box plate. Using hand tools, three maintenance men in a large southern cotton mill were unable to cope with the demands for repairing between 150 and 200 box plates daily.

When an Ingersoll-Rand Size 00BR1LC21 Reversible Air-Powered Screwdriver was put on the job, the work was speeded to the point where two men can now easily keep up with the daily requirements, thus saving the company $9.20 per day in labor costs. At this rate of saving, the tool paid for itself in the first eighteen days of operation.

Steam leaks cost money . . .

Small "Pesky" Valve Repairs Eliminated in Virginia Plant

HOLDING the number one spot in the processing of quality Smithfield Hams for domestic and foreign consumption is the Smithfield Packing Co., of Smithfield, Va. Another manufacturer of quality products, the Lunkenheimer Co., also known throughout the world, is helping the Smithfield meat-packing firm maintain the quality of Smithfield Hams efficiently, economically, and safely.

Like many meat packing plants, Smithfield was beset by constant valve maintenance — a virtual merry-go-round of maintenance resulting from wire-drawing under heavy duty service. And like many organizations, Smithfield discovered that its maintenance staff, selected for its skill and ability to keep the plant's major equipment functioning, was being overly burdened by small "pesky" valve repairs.

The ordinary valves that were being used in the Smithfield plant started to leak, on an average, after some six months' service. Leakage is costly — a steam leak of only 1/16-inch diameter at 160 psi pressure means 19,280 lb wasted per month, costing about $16.39 per month.

Leaky valves mean hazardous floor conditions in cold processing rooms as well as the resultant additional work-load thrown on the refrigeration equipment.

In an effort to balance the maintenance work load, Lee Underwood, Plant Engineer, installed Lunkenheimer LQ600 bronze globe valves on several of the worst trouble spots, where valves are throttled almost 100% of the time while in operation. These spots include sterilizer pot steam lines, hot water lines to slicing tables, and steam and water lines to mixing pipe tees at cleaning-down stations.

The continuous performance record of LQ600 in these installations is made possible by flat seats and discs of Brinalloy, a metal that is more resistant to wear than 500 Brinell stainless steel and actually outwears stainless steel exceeding 1,000 Brindell hardness.

As a result of the success of the initial installation of LQ600 valves about a year ago, Underwood has made this valve a regular stock item, and they are now being used for new installations and replacement of all steam and hot water valves in the plant.

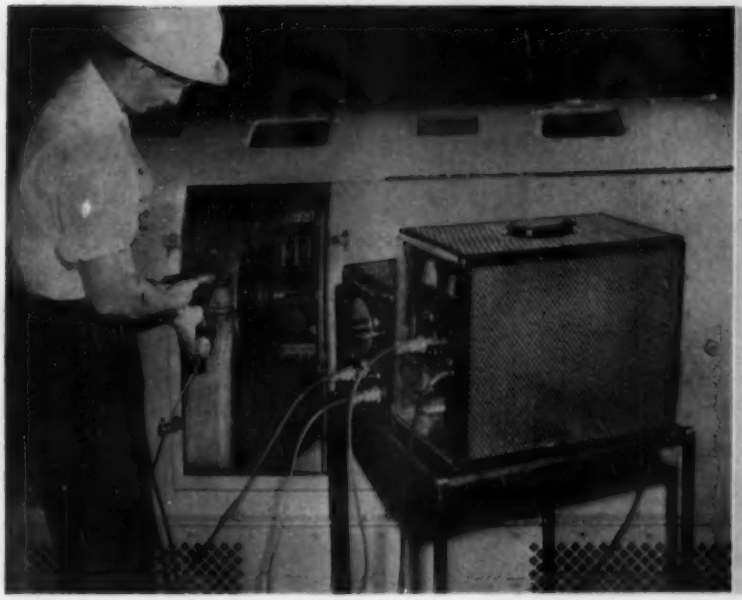
Gear Drive Made "Noiseless"

NOISE and lubrication problems which previously plagued a mill that bores giant stainless steel ship propellers have been eliminated by replacing a gear drive with a rubber-fabric transmission belt with teeth.

The 144-in. mill, located in the Harvey, La., plant of Avondale Marine Ways, Inc., the country's only stainless steel ship propeller plant, was originally driven by steel and cast iron gears. When doing such rugged jobs as boring propellers over eight feet in diameter and weighing over a ton, conventional gears were noisy and presented lubrication problems because they were under constant high strain.

Since the installation of a PowerGrip "timing" belt made by United States Rubber Co., however, the noise level of the drive has been reduced to a whisper. The rubber-fabric belt, strengthened with steel wire, has teeth and turns in a grooved pulley to give silent, non-slip transmission.

The "timing" belt in use at Harvey is 120 in. in circumference and 4 in. wide. It transmits 30 hp in the mill drive and requires no lubrication.



Balancing Is Exact Procedure in Virginia Plants . . .

Troubleshooting VIBRATION with Electronics

By GERALD L. BOURDAGES
The International Research and Development Corp.

ELECTRONICS replace "trained fingertips" and "educated screw drivers" in detecting and measuring vibration and correcting imbalance in the power house.

Old Way

Turbine No. 3 had the "shakes" and there was a long time to wait before the next scheduled shutdown. Two alternatives could be taken; the first was to sit tight and wait for the worst, the second was to try to repair the turbine.

In the latter case, the first step was to call in the vibration expert: the man with the "trained fingertips" or with the "educated screw driver." If this man was lucky he pinpointed the source of vibration. If unbalance was thought to be the cause of vibration, the turbine was stopped, a weight was added here, another there, then the turbine was restarted. By now, everyone held their breath. Would it work better or would it shake the bolts loose? However, luck was with the expert; after several guesses along the above lines, the turbine worked and the vibration was reduced. The old coin could not stay on edge, but a bolt did stand up on the exciter housing.

New Way

Turbine No. 2 also had the "shakes." Here again, it was decided to repair it immediately. However, in this case the vibration expert was an electronic vibration troubleshooter (vibration analyzer). The pickup was placed on the exciter bearing housing; the meter

ABOVE LEFT — Reading taken at exciter bearing.

ABOVE RIGHT — At turbine bearing.

RIGHT — Stroboscopic lamp, being triggered at the speed of shaft, provides a "window" to balancing by giving the relative phase of imbalance.

FAR RIGHT — Steam turbine being treated for vibration and imbalance. From pickup probe on bearing housing vibrations are transmitted to filter (right), then to analyzer. Analyzer registers the amplitude and frequency. It also triggers stroboscopic light at predominant frequency, permitting inspection and showing angle of imbalance.

read that there was a 4 mils vibration displacement there. Next the pickup was placed on the bearing housing between the turbine and the generator; here the meter read 5 mils. The next place to check was the governor end housing; here the meter read 3 mils.

Within a few minutes, the maintenance man had a complete summary of the vibration conditions of the stationary and rotating components of the turbines. Most of the vibration was in the turbine itself. To complete his analysis, he opened the exciter shaft cover and placed the pickup at the important points of measurement. With a flashlight-type stroboscopic lamp triggered by the pickup, he learned the phase of imbalance in the turbine by viewing the end of the shaft.

The balancing was accomplished by using an established procedure whereby the electronic system indicated both the amount of correction required and the proper angle at which the correction should be made. The results were that the vibration level was reduced to a maximum of four-tenths of one mil at any measuring point.

The use of electronics to troubleshoot and measure vibration, and to dynamically balance turbine or any other machinery having rotating components is relatively new. This electronic system consists of an inductive type vibration pickup which detects the vibration and converts it into an electric signal which is passed into electronic circuitry contained in a portable console. The amplitude or displacement of the vibration is registered directly in thousandths of an inch on a meter.

Another meter directly presents either the frequency of the dominant vibration or the frequency to which a variable filter is tuned. The electric signal also triggers a stroboscopic light in synchronization with the frequency of the vibration to observe the angle of unbalance. Thus one is able to observe an unbalanced rotating part as if it were stopped when viewed under the stroboscopic lamp.

Here are typical examples of the results obtained with such an electronic system to accurately troubleshoot any rotating equipment.

a. This system located a high vibration in a blower system. A stroboscopic lamp inspection (with the stroboscopic lamp triggered by the vibration pickup) showed three gear teeth were broken from the main gear drive. Further running of the blower would have caused a failure of the entire gear system.

b. Using the old trial and error method, maintenance men had torn down a blower assembly and replaced the bearings three times in a short while. The electronic system located a bent shaft as the cause of the trouble.

c. Using the electronic system, men were making a periodic checkup on a 450 hp motor. The vibration level was not excessive but the frequency was higher than usual, which pointed to a change in bearing conditions. An inspection showed dry bearings. This also prevented possible breakdown of several other motors which were purchased at the same time, and for similar uses.

Example

The use of electronics is not limited to troubleshooting but is also used in preventive maintenance.

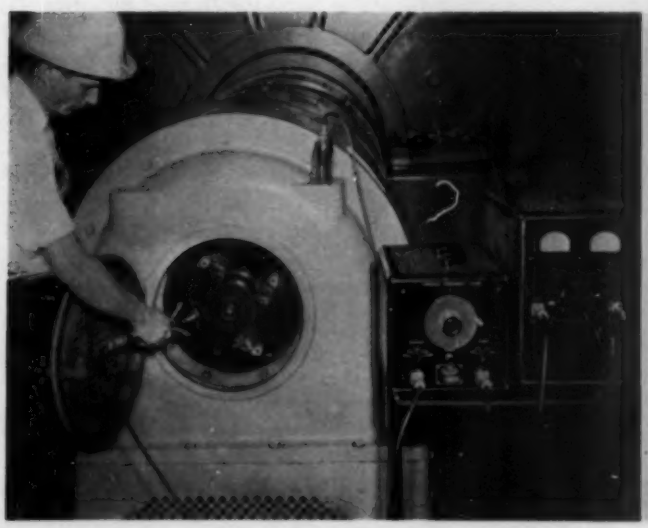
The Potomac Edison Company, Hagerstown, Maryland, among others, uses this type of equipment in its preventive maintenance program.

First, log sheets were drawn up with spaces to record the vibration readings and location of reading point. Periodically readings are taken. If the amplitude or the frequency increases over previous readings sufficiently to require that remedial measures be taken, they are able to plan the repair or replacement of the affected parts at an opportune time.

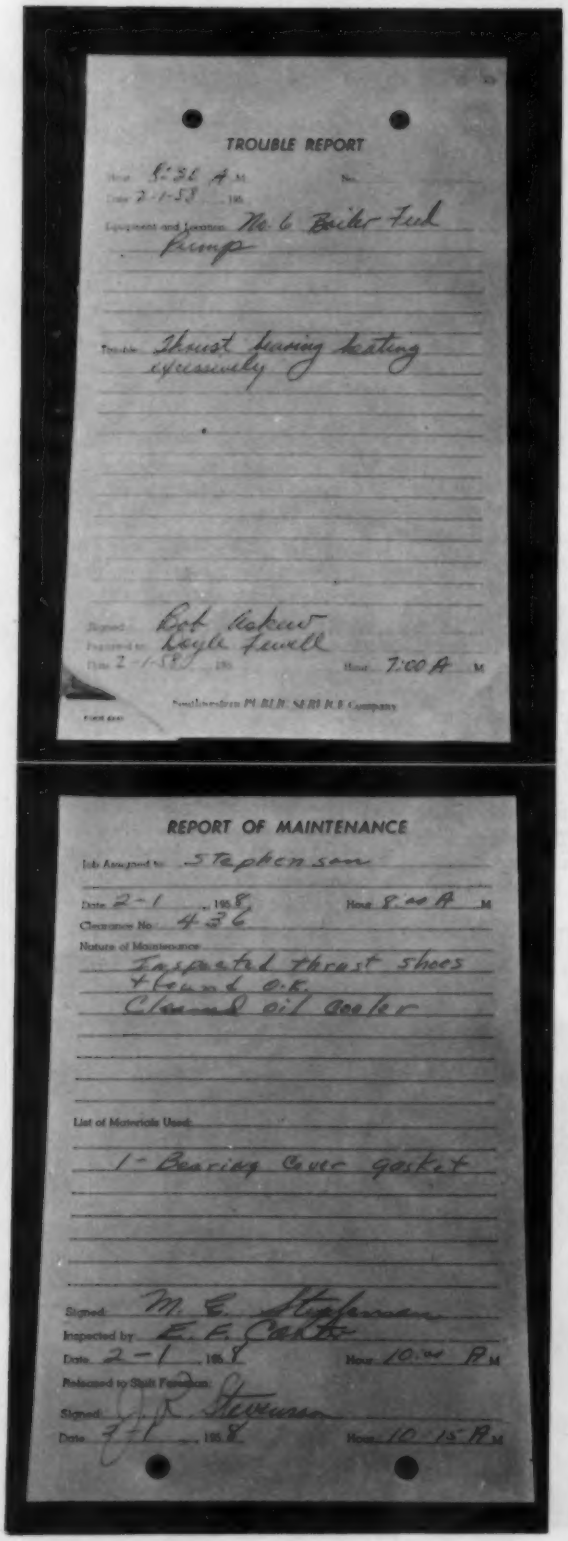
Equipment

This electronic system is called a vibration analyzer and is developed and manufactured by The International Research and Development Corporation, Worthington, Ohio. It consists of a hand-

(*Continued on Page 56*)



Minimum "paper work" gives good control of . . .



TROUBLE REPORT

Time 8:30 A M No.

Date 2-1-58 19

Equipment and Location No. 6 Boiler Feed Pump

Trouble Thrust bearing heating excessively

Signed Bob Stokes

Reported to Doyle Terrell

Date 2-1-58 19 Time 7:00 A M

Southwestern Public Service Company

REPORT OF MAINTENANCE

Job Assigned to Stephenson

Date 2-1 19 58 Time 8:00 A M

Clearance No. 436

Nature of Maintenance

Inspected thrust shoes & found O.K.
Cleaned oil cooler

List of Materials Used

1 - Bearing Cover gasket

Signed M. E. Stephenson

Inspected by E. E. Cobb

Date 2-1 19 58 Time 10:00 P M

Released to Shift Foreman

Signed J. R. Stevenson

Date 2-1 19 58 Time 10:15 P M

"Minor" PLANT MAINTENANCE

By J. D. BALLEW and C. A. MORROW
Southwestern Public Service Company
Amarillo, Texas

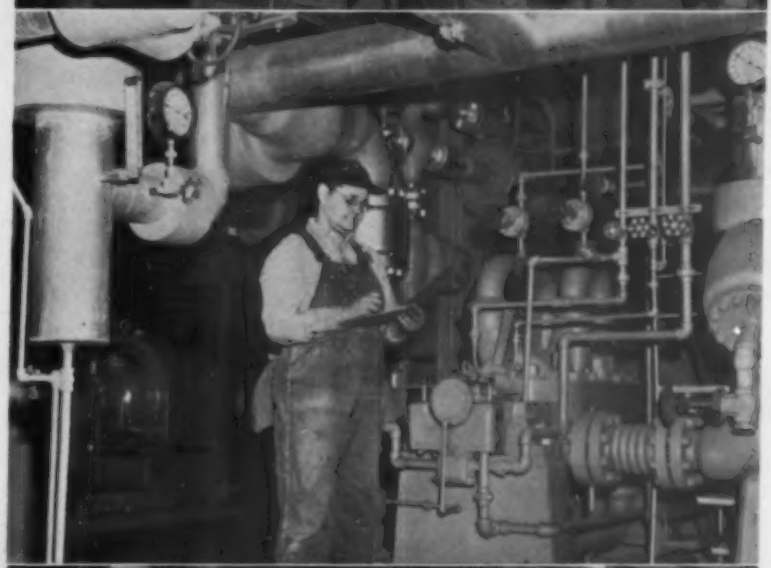
IN THE modern power plants of Southwestern Public Service Company, good maintenance is a must. With the advent large single boiler-turbine combinations, higher pressures, centralized control, and higher capacities, maintenance costs, if not properly controlled, can become disproportionately high.

Maintenance can be classified as major or minor. Major maintenance may include turbine, boiler, and pump overhauls, equipment modifications, etc. Minor maintenance would include pump and valve packing, oil leaks, insulation, pump testing, bearing inspections and preventive maintenance of a routine nature.

Major overhauls, repairs or modifications generally receive adequate planning and preparation. Poor minor maintenance ultimately results in major repairs and extra maintenance costs.

The illustrated maintenance record system has given us the necessary minor maintenance control that results in an overall reduction in costs. These records satisfactorily perform the following:

1. Provide the operating personnel with a convenient means of reporting items which need attention.
2. Give the maintenance foreman a written record of work that needs to be done.
3. Provide the maintenance foreman a means of giving his mechanics a written outline of the necessary maintenance.
4. Permit the mechanic to report in writing the repairs made and materials used.
5. Furnish the storeroom clerk a written record of materials used.
6. Provide the maintenance foreman and plant manager a running record of work completed and work pending.
7. Furnish ordering information on all equipment (name plate data, etc.).
8. Provide permanent maintenance history on each piece of equipment.
9. Schedule preventive maintenance on quarterly, semi-annual or annual basis.



ONE FORM — ONE CARD FILE

OPERATOR (above) completes "Trouble Report" form in duplicate to report operating difficulty. Form is illustrated on opposite page. The white original (top view) goes to pending file in plant office.

Duplicate copy (a manila card) goes to maintenance foreman. On the back of the duplicate (lower view, opposite page) the maintenance foreman fills in mechanic's name to whom job is assigned, date and hour assigned and clearance number. He is filling in this form in upper right photo.

When maintenance is completed (photo at right) mechanic writes a description of maintenance done, materials used and signs it.

After inspecting the equipment, the foreman releases it to the operating foreman and signs the release section of the report showing date and hour. Before returning duplicate to the office, the storeroom clerk checks for ordering information on replacement parts.

Upon return to the office, the white original is pulled from the pending file and the mechanic's report is transcribed on the back of the original and passed on to the operators for their information. Data on duplicate is transcribed to permanent card file (photo at right) for future reference.

This card file provides the following information on each piece of equipment — Name plate data and other identification, permanent record of maintenance and parts used, and the due date for routine preventive maintenance.

Better performance and lower maintenance costs . . .

how to get more from your COMPRESSED AIR POWER

BY PROPER compressed air processing you can extend the life of your air tools and air-actuated devices, reduce maintenance expenses, increase efficiency, and reduce compressed air costs.

ABRASIVE SOLIDS

Air drawn into a compressor frequently contains solids which may or may not be effectively removed at the compressor intake. Ever-present moisture in the system accelerates corrosion and when these corrosion products break loose, they are easily carried by compressed air to all equipment. Removal of such solid material is essential.

CORROSIVE LIQUIDS

Filtration—proper selection and use of the most suitable filters will guard against pipe scale, pipe dope, condensate, and deteriorated compressor oil inherently present in all compressed air systems. These contaminants should be removed before the air is permitted to enter air tools, valves, etc.

Water or condensate is forced from the air by the compression and expansion cycle. It should not be permitted to enter or accumulate within air-actuated equipment.

Frequently, oil from the compressor will be carried into the piping system. This deposit is a sticky, gummy substance which must be filtered out.

Pressure Regulation — air-actuated equipment operates most efficiently at the manufacturer's specified operating pressure. Operation above recommended pressure increases rate of wear and reduces equipment life. Efficiency of equipment usually is lower when operating above normal air pressure. Therefore, compressed air is wasted.

The benefits of proper control of air-operating pressure are obvious.

Filtered, Regulated, LUBRICATED AIR...

Lubrication — most efficient and economical method is to inject a lubricant into the compressed air that powers equipment. Airborne lubrication introduces metered amounts of lubricant into the air stream and atomizes it into a fog that is carried to the equipment, coating essential operating parts. Any time the equipment is operating it is being lubricated, assuring optimum continuous lubrication.

Material adapted from *"You Benefit by Proper Compressed Air Processing,"* a recent bulletin of the C. A. Norgren Co., Englewood, Colorado. For complete copies ask for form 589.

At Acipco in Birmingham . . .

Pre-Punched Cards Control Maintenance Stock

BINS AND CARDS arranged as in photo, speed withdrawal of parts and avoid necessity for a stores clerk. This specialized card procedure fits right in with the standard IBM system of records and cost accounting.

SOME three years ago, due to the rapid growth of operations and the installation of much automatic equipment, American Cast Iron Pipe Co., manufacturer of cast iron pipe and special steel products, was swamped with the problem of a large maintenance stores inventory to provide supplies for 47 electrical department employees.

The policy on maintenance parts and supplies had been to charge them out to the job using them as soon as received. Since each job usually had a surplus of material upon its completion, an accurate record of charges and usage, or balance left in stock was impossible.

The company decided to try this operation on the IBM. Nearly 400,000 items had to be recorded and placed in suitable bins. These bins were arranged into 50 sections (in some cases a section contains as many as 200 bins). Card racks, each holding approximately 50 cards, were placed in each bin to hold the necessary IBM cards which are pre-punched according to the items they represent. The thirty-fifth card in each rack is a trailer card which indicates to the IBM operator that another batch of these cards needs to be pre-punched. In many cases each bin has more than one item, so an individual group of cards for each item is mounted in the respective bins.

A Master Book was prepared in which the stock was arranged in alphabetical order to make the job of locating any item easy. Each Vendor from whom supplies were purchased was assigned a Vendor Code Number. This data was punched on the cards with other necessary information. Nothing is lacking on the pre-punched cards except the quantity to be withdrawn and the charge number.

The system does not necessitate a stock room clerk, as such. Instead, any electrician goes right to the bin and takes the parts he needs for his current job. But he also has the minor clerical duty of filling in the number of units withdrawn and the job number (in pencil) on one of the pre-punched cards. Then he puts that card in an "outgoing box" located on the end of each bin section for that purpose.

Once each day (at the same

(*Continued on Page 60*)

By K. L. DILLON
Chief Electrician
American Cast Iron Pipe Co.
Birmingham, Alabama

Reduce outages and make your troubles minor . . .

CHECK-LIST for Power Distribution Systems

By **A. W. FRANKENFIELD**
Senior Electrical Consultant
and
T. P. SOSLOWSKI (standing),
Electrical Engineer
E. I. du Pont de Nemours & Company
Wilmington, Delaware

THIS CHECK-LIST for a typical power distribution system is not necessarily complete. The authors emphasize that the engineer should prepare his own check-list and schedule the frequency of requirements for the system which is his responsibility.

IT IS very easy to overlook many of the vital contributions that an industrial plant's distribution system can make to profits. The distribution system is practically motionless, and yet it renders silent services that attract little attention. In contrast, production equipment is usually alive with activity that is making a visible contribution to the finished product.

The distribution system is an intricate part of any piece of electrified production equipment. Without proper preventive maintenance, the system cannot be expected to provide reliable service for continuous production. The following should be considered to provide this continuity required:

BUSHINGS

Once a Month

a. Bushings should be inspected for porcelain fractures, rough edges and chips; fractures which may cause leakage of filler; deposit of dirt (a cause of flashover when moist).

Once a Year or After Severe Fault Interruption

a. High voltage bushings should be cleaned with high pressure water or a solvent, such as carbon tetrachloride, applied with a cloth. If the dirt cannot be removed with above, use a porcelain cleaning powder.

b. Chipped surfaces should be pointed and sealed from moisture.

c. All bushing metal parts should be checked for corrosion and fractures.

d. Check the seals between metal and porcelain for crumbling, chipped surfaces, presence of oil, need for a new sealer, deterioration of gaskets.

e. Check cable and bus terminations for thermal discoloration. Terminations may require tightening.

f. Check cable connections for excessive pulling, strain or bushing.

g. Test bushing for resistance of insulation. Bushing should test more than 20,000 megohms.

h. Test bushing for power factor. Certain type of bushings are removed from service if power factor is higher than 12%; other types are replaced if power factor is higher than 6%. These limits are based on bushing temperatures of 10° to 25°C. Limiting power factor should be checked against manufacturer's recommendations.

CABLES

Every Six Months or After Severe Fault Interruption

a. All cables and wire circuits should be inspected for overload with a clip-on ammeter.

b. Check cable for excessive temperatures by placing a suitable thermometer on the cable surface and splices if accessible.

c. Inspect accessible part of cable for swelling and softening of insulation or jacket due to seepage of oil or hot water.

Once a Year or After Severe Fault Interruption

a. Cable should be checked with a megohmmeter; although this method does not always reveal weak spots, it will give some indication of the condition of the cable.

Plant should keep a written record of all of the above checks and tests.

KNIFE SWITCHES AND DISCONNECTING SWITCHING

Once a Year or After Severe Fault Condition

a. Knife Switches and Disconnecting Switches should be thoroughly cleaned with a clean cloth. After cleaning:

1. Apply G-E compound No. 5485 or its equivalent.

2. Check clearance between the tongue of the blade at all accessible points. This clearance should be less than 0.002 in.

b. Copper oxide on contact surfaces of copper switches should be cleaned by opening and closing the switch several times in succession.

c. Enclosed switches should be examined for proper operation of the handle and operating mechanism. Care must be taken to see that cover and interlock are in good condition, that the full load current is within the rating capacity of the switch, that the switch is readily accessible and that the enclosure ground connection is intact.

d. High voltage disconnecting switches should be checked for clean insulator surfaces and for proper function of blade latches and proper clearances in the arc-chutes. Arc-chutes should be thoroughly inspected for any distortion of plastic material, which would prevent free movement of the blades.

GROUP OPERATED SWITCHES

Once a Year or After Severe Fault Condition

a. Check the adjustment of the operating rods and interphase shafts for simultaneous opening and closing of all the poles without any binding. Each blade should enter the contacts centrally while closing.

b. Lubricate the bearings with lubricant recommended by manufacturer.

c. Check with a scale for the pull in pounds necessary to open from a fully closed position and the pull necessary to open blade against hinge friction only.

400 amp — 15 kv multiple tongue switch will require 18-22 pounds pull per blade from fully closed position and only ¾ lb for hinge friction.

600 amp, 15 kv 23 to 27 lb/blade and 4 to 5 lb for hinge.

1,200 amp., 15 kv, 41 to 49 lb/blade and 6 to 8 lb for hinge.

2,000 amp, 15 kv, 59 to 71 lb/blade and 6 to 8 lb for hinge.

BUS BARS

Once a Year or After Severe Fault Condition

a. Check the metal enclosed bus bars for overheating and any evidence of tracking and condensation.

b. All bolts and nuts at all joints should be properly tightened.

POWER CIRCUIT BREAKERS

Every Six Months or After Severe Fault Interruption

a. Check dielectric strength of oil in power circuit breakers. If dielectric strength is less than 22,000 volts (or less than volts recommended by manufacturer) as measured by the standard test between 1-inch disks spaced 0.1 inch apart, it should be filtered. The dielectric strength of new oil should be 26,000 volts or greater.

b. The power circuit breaker should be checked for proper oil level.

c. Oil level gage on tank of power circuit breaker should be checked for accuracy.

d. Oil valves on tank of power circuit breaker should be checked for leaks.

e. All gaskets should be checked for proper seal against water and oil leakages.

Every Twelve Months or After Severe Fault Interruption

Power circuit breakers should be checked for:

a. Bushing contact misalignments and bushing oil level.

b. Freedom from dirt and all traces of carbon or sludge on any internal insulating parts.

c. Contact misalignment. Contacts should be adjusted in accordance with breaker instruction book so that contact surfaces bear with firm and uniform pressure. All badly pitted contacts should be renewed.

d. Proper operation of breaker mechanism and freedom from binding. All bearing surfaces should be oiled as recommended by manufacturer. All cotter pins, snap rings, locking plates,

CHECK-LIST (Continued) for Industrial Plant Distrib. Systems

nuts should be in place and tight. Stop clearances should be checked against manufacturer's recommended clearances. Oil dashpots should be filled with oil. Operating rods for the movable contacts should be checked for binding. The length of the breaker stroke, its opening and closing speed should be adjusted in accordance with manufacturer's recommendations.

e. Proper lubrication of operating mechanism. Check for scored or worn parts. Adjust in accordance with manufacturer's recommendations.

f. Correct operation of operating mechanism at proper voltage and current.

g. Proper operation and condition of contacts on the closing relay.

h. Auxiliary switch adjustments. Damaged contacts should be replaced or "dressed" after finding out cause of damage.

i. Proper opening to closing speed. Analyzer should be used to detect any changes in the opening or closing speed.

LOW VOLTAGE AIR CIRCUIT BREAKERS

Every Twelve Months or After Severe Fault Interruption

Air Circuit Breakers should be checked as follows:

a. Check contacts for dust and dirt and take contact impression by closing contacts on a piece of thin tissue paper and a piece of thin carbon paper, with the carbon next to the tissue. Closing and opening of good contacts will give an impression of 75% or more of the length of each bar on the contacts. Check for any heating, discoloration and oxidation. Renew any severely pitted contacts. Contacts can be rough, but should be clean and bright.

b. Check cable terminal connectors for overheating and see that all joints in the connections are intact and in good condition.

c. Check the mechanisms for sufficient spread of cotter pins, for tightness of all bolts, for any binding of rods. Operate breaker several times and be sure all parts are properly functioning. Oil all bearing points and wipe off excess oil.

d. Trip latches should be checked for free movement of parts and that the armature has sufficient travel to release breaker latch. To eliminate undue tripping, check calibration setting for proper protection. Clean plastic materials (arc-chutes, timing pots, etc.), with kerosene or naphtha.

e. Check control switch and closing relay for proper operation. Replace any burned out indicating lamps.

f. Check enclosure ground connection and see that it is intact.

g. Check undervoltage devices for proper and positive tripping. Check oil dashpots for cleanliness and refill with oil. Blown fuses in control circuits should be replaced after checking out the entire control circuit.

h. Observe breaker, while carrying full load current, for any overheating and for any transfer of heat into the breaker from the connecting conductors.

SWITCHGEAR RELAYS

Annually or After Severe Fault Condition:

a. All switchgear relays should be tested. This annual test should include:

Calibration test. Each relay element should be checked for current, potential, and power at pickup, "dropout," and intermediate points.

2. Time setting Check-Relay should be operated under simulated faults.

3. Tripping tests — Circuit Breakers should be tripped by operating the relay electrically.

(Plant should own a portable load box for relay testing, a synchronous timer, ammeter, and switching devices.)

Every Six Months or After Severe Fault Condition

a. Switchgear relays should have dashpots or other time devices checked and inspected. Relay contacts should be operated by hand to simulate tripping.

b. Silver Relay contacts are to be cleaned with special burnishing tools. This cleaning action is to remove corrosion without scratching.

c. All jewel bearings used in relays are to be checked for dirt or dust and sluggish or impeded movement.

Jewels are not to be lubricated except when a new jewel is installed. Then watch oil or meter-jewel oil is to be used. A drop of oil, such as will cling to the point of a fine needle should be sufficient for a new jewel.

See that all targets (if used) or lights are in proper functioning condition.

Check each relay for noise and loose parts. It should be quiet in operation.

Check all connections for tightness.

It is not implied that following a definite maintenance program will entirely eliminate system outages or difficulties . . . however, experience in the du Pont Company has shown that outages can be reduced and any difficulties occurring will be minor.

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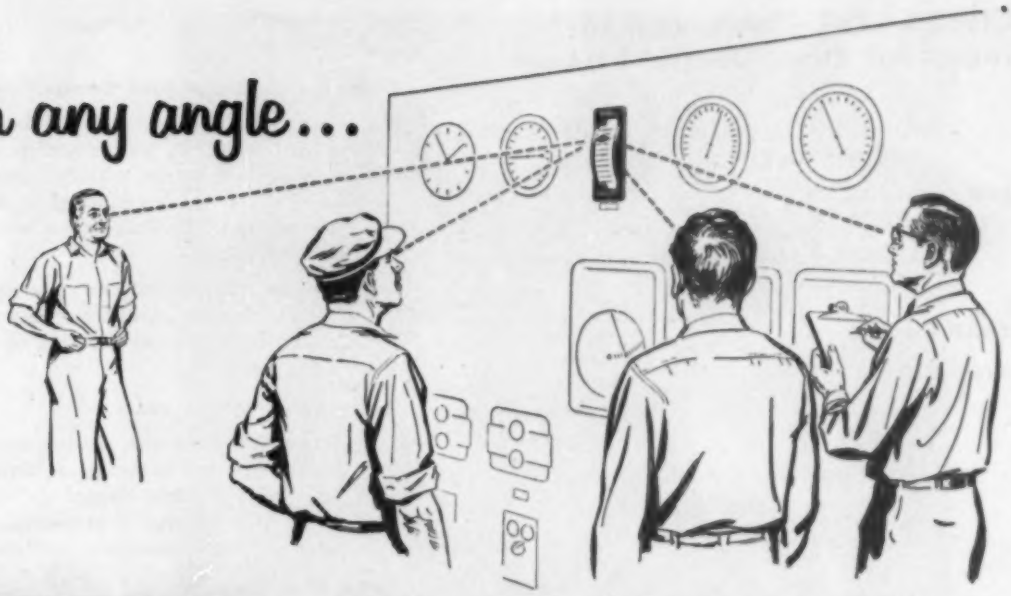
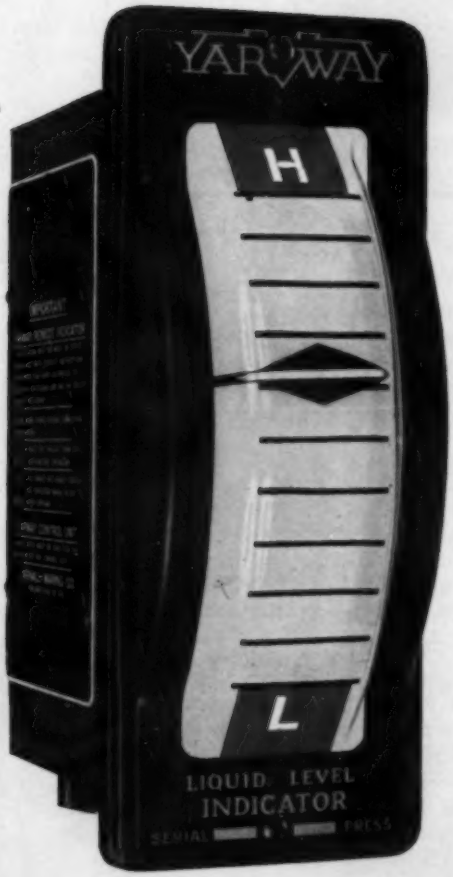
from any angle...





BOILER WATER LEVELS ARE EASIER TO READ with YARWAY INDICATORS

No matter where you stand, you can see at a glance your boiler water level in the Yarway Remote Liquid Level Indicator. The clear, "wide vision" face permits easy readings from any point in a 180° arc.

Readings are instant and accurate because the operating mechanism is actuated by the boiler water itself—by the pressure differential between a constant head and the varying head of water in the boiler drum. Pointer mechanism is never under pressure.

Yarway Remote Indicators are available fully compensated for every change in boiler temperature and pressure and they can be connected to Electronic Secondary Indicators or remote Hi-Lo Alarm Signals (lights or horns), located at any other point in the plant. Also available, Yarway Recorders working on same simple principle.

Over 12,000 Yarway Remote Indicators already installed.

Write for full details on Yarway Indicators for boilers, heaters and other applications. Bulletin WG-1824 tells all, shows typical hook-ups.

YARNALL-WARING COMPANY

Home Office: 116 Mermaid Avenue, Philadelphia 18, Pa.
Southern Representative:
ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.

YARWAY

...a good way to specify remote liquid level indicators

CHECK-LIST (Continued) for Industrial Plant Distrib. Systems

Insulation of relay connections should be tested for dielectric strength.

Every Three Months

1. Relays protecting primary feeders and main power transformers should be inspected for proper operation.

TRANSFORMERS

Every Shift

a. An inspection and record should be made of the following:

1. Liquid level gage on all transformers.
2. Ambient temperature and weather condition.
3. Liquid and winding temperatures of all transformers.
4. Load (amperes) on each transformer bank.
5. Load (amperes) on each feeder.
6. Voltages on each transformer and each feeder.
7. Condition of diaphragms (if used) on all transformers.

Every Six Months or After Severe Fault Interruption

a. Check transformer oil by dielectric test. It should check 25 kv or above with one inch diameter electrodes 0.1 inch apart. Oil should be filtered if oil has dropped to 20 kv. Facilities are available for filtering oil when transformer is in operation.

b. Ground connections and ground resistance on the transformer should be checked. This is very important for proper relaying on grounded neutral systems.

Every Seven to Ten Years

a. Transformers should be inspected for general condition, such evidence as moisture and displacement of parts caused by abnormal operations. More frequent inspection can be made after a severe operating condition.

Every Five Years

a. Transformer oil should be drained off sufficiently to allow inspection above the core for sludge and general condition.

From Heat DIRECT to Electricity

(*Comments start Page* 32)

the other relatively cold) inside a vacuum tube similar to a radio or television tube.

Heat is applied to one of these plates at about 2,200 F. This is the hot plate. The other plate, which is spaced only about a thousandth of an inch away, is maintained at about 1,000 F. Though still very hot, this is the "cold" plate.

In operation, electrons are boiled off the hot plate onto the cold. When the plates are connected by a wire outside the tube with an external load, the electrons are conducted off to produce useful work.

The M.I.T. model of the heat engine has produced electric power with thermal efficiencies of about 12%, and the inventors feel that efficiencies of about 30% may eventually be obtained.

The two M.I.T. engineers are also investigating another thermo-electron engine which uses crossed electric and magnetic fields to control the flow of electrons. They predict that this device may attain even higher efficiencies than their present model.

"Even on the basis of the current model," says Professor Kaye, "it appears that a relatively efficient power plant can be built to yield from 5,000 to 15,000 watts per cubic foot of total plant volume with a probable thermal efficiency of better than 10%."

But this does not mean that electron heat engines will be in use tomorrow. A lot of development work lies ahead before they can be put into commercial operation. This will be undertaken by the Thermo-Electron Engineering Corporation of Cambridge.

Free electrons, found in most metals, are forced to leave a suitable metal by heating it to a high temperature, such as 2,000 F. The heating creates a stream of "hot" electrons, some of which possess sufficient energy to overcome a potential barrier or an applied voltage. This tends to slow down these electrons and so provides a means of extracting directly useful energy in the form of electrical output.

The electrons which overcome this applied voltage are collected in another metal and heat is rejected from this metal to the surroundings. The useful electrical output is obtained by connecting the hot metallic surface externally through a load to the cold collecting surface.

This Bailey Meter Control System is —

Saving Fuel at Appliance Park

★ General Electric Company at its Appliance Park Boiler House, Louisville, Ky. has found that Bailey Controls help to save fuel by continuously maintaining desired operating conditions.

With a Bailey-engineered control system you can count on a high output of available energy per unit of fuel.

Here's why:

1. Suitable Equipment

When you receive equipment recommendations from a Bailey Engineer his selections come from a complete line of well-engineered and carefully tested products.

2. Seasoned Engineering Experience

Your local Bailey Engineer brings you seasoned engineering experience based on thousands of successful installations involving problems in measurement, combustion, and automatic control.

3. Direct Sales-Service—close to you

For your convenience and to save time and travel expense there's a Bailey District Office or Resident Engineer in or close to your industrial community.

For greater fuel savings, less outage and safer working conditions, you owe it to yourself to investigate Bailey Controls. Ask a Bailey Engineer to arrange a visit to a nearby Bailey installation. We're glad to stand on our record.

A128-1

FORMULA
for Cutting Steam Costs

\+ Bailey Design
\+ Bailey Engineering
\+ Bailey Service

= Greater Savings per Fuel Dollar

BAILEY
METER COMPANY
1028 IVANHOE ROAD
CLEVELAND 10, OHIO
Complete Controls for Steam Plants

BAILEY METERS

Controls for
COMBUSTION
FEED WATER
TEMPERATURE
PRESSURE
LIQUID LEVEL
FEED PUMPS

...another m

The *Exclusive* Single H

Saves Space

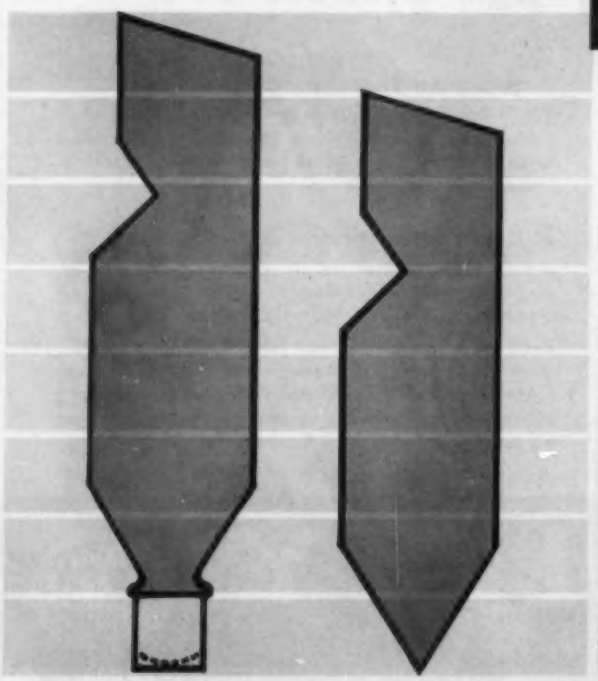
Reduces overall height of structure. Permits higher capacity in restricted area.

Adaptable to

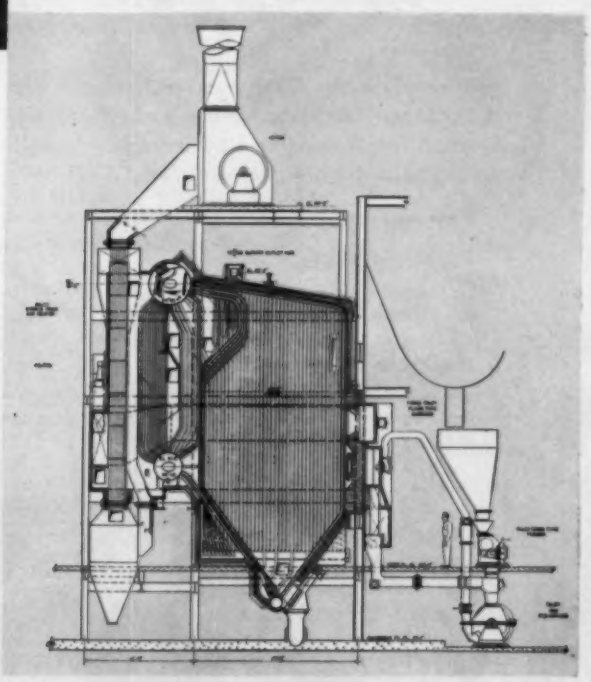
High capacity central station type units

and to

Small industrial type units



Unit with hopper added. Single Header Hopper Unit.

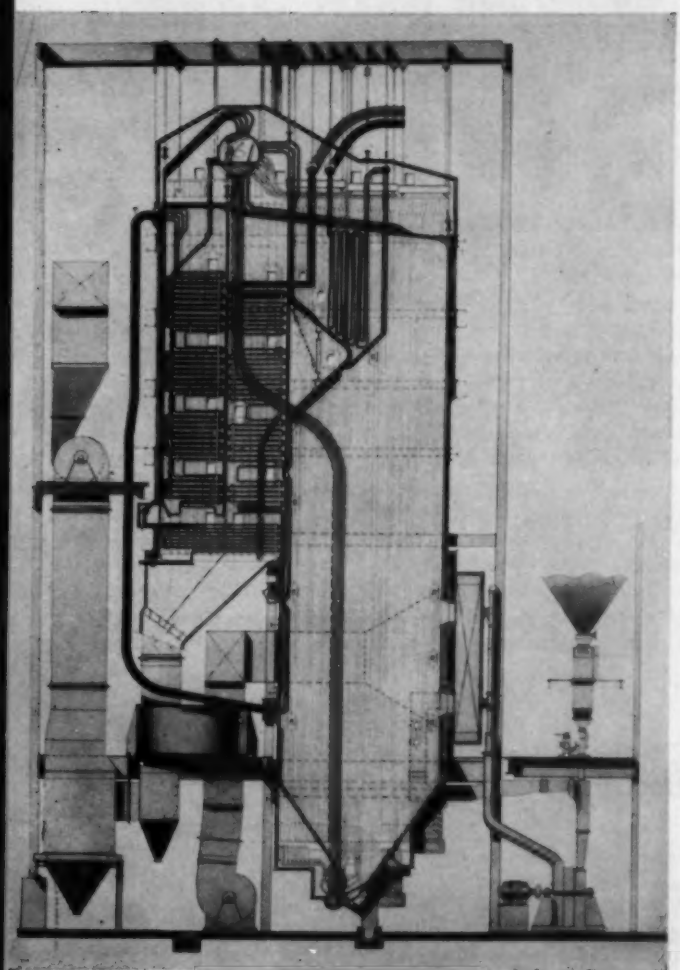


A 60,000 lbs/hr industrial type unit with Single Header Hopper

A survey of your plant by qualified consulting engineers could show ways of making surprising savings in your power costs.

er money saving RILEY design feature

e Header Hopper Bottom



A large Riley public utility reheat unit with Single Header Hopper

The Riley Single Header Hopper is so called because the furnace wall tubes are used as the sloping sides of the hopper and connect to a single header at the bottom. This simple arrangement eliminates the space required to install a separate ash hopper, thus reducing the overall height of the unit and permitting a unit of higher capacity to be installed where head room is a limiting factor. Additional savings are realized in the elimination of hopper seals and their maintenance.

Riley units with Single Header Hopper Bottoms are especially suited to multiple fuel firing and are extremely successful with coals of low ash fusion temperature. If installed initially to burn either coal or gas, coal can be burned at any time; a simple hydraulic or pneumatic ash removal system can then be added.

Riley Single Header Hopper Bottom Units are furnished in any steam capacity, temperature and pressure.

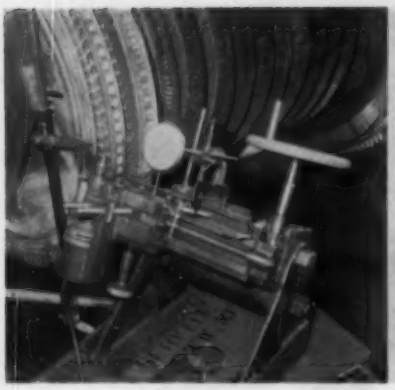
It will pay you to investigate further the economies possible in this exclusive Riley design feature.

RILEY

STEAM GENERATING & FUEL BURNING EQUIPMENT

Riley Stoker Corporation, Worcester, Mass.

Atlanta, Buffalo, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Kansas City, Los Angeles, New Orleans, New York, Philadelphia, Pittsburgh, Portland, St. Louis, St. Paul, Salt Lake City, San Francisco, Seattle, Worcester.



Photos show how compound was mounted to feed hand grinder and maintain the accuracy required.

Entrance edge was ground to a true radius all around.

Accurate Milling Required for Turbine Bucket Change

By J. R. MOFFATT
Carlsbad Plant Machinist
Southwestern Public Service Co.

THE MANUFACTURER of one of the turbines here at Carlsbad Power Plant, recently recommended that we make a slight modification to the first stage buckets of the unit. This consisted of cutting back the entrance edge of each 1st stage bucket .150", leaving edges rounded and polished to within 1/16" of bucket base. The remaining 1/16" was to be milled to a radius. The purpose of this modification is to prevent cracking of the extremely thin leading edges.

In order to do the machining, it was necessary for the maintenance department to set up a compound in such a manner that we could cross feed into the leading edge of the buckets at a rate of .001" feed in, and then carry the cut across bucket face to within 1/16" of base. This would allow taking a very light cut and prevent chatter and vibration. The 1/16" radius at the bucket base was to prevent cracking at that point.

In setting up to do the job, the spindle was mounted on "A" frame supported babbitt bearings to maintain alignment and provide necessary journal protection when turning. To support the cutting equipment, a rigid bracket was attached to the front "A" frame. A high speed hand grinder was mounted on the compound and a carboloy tip fly cutter made to do the actual cutting since turbine bucket material is very tough.

For feed in control, we used a 2" travel dial indicator. A pointer was set up for indexing, the bucket edges were checked to be certain they were in perfect alignment for cross milling.

To rotate the turbine spindle, we used a hydraulic jack for accurate positioning of spindle in relation to cutting tool. For safety, a plastic shield was mounted on the compound and an eye shield was worn by machinist during cutting operation.

In all, 120 buckets were milled to specifications called for on manufacturers drawing, with excellent results. After equipment was set up, the entire cutting and polishing operation was completed in four 8 hour days.

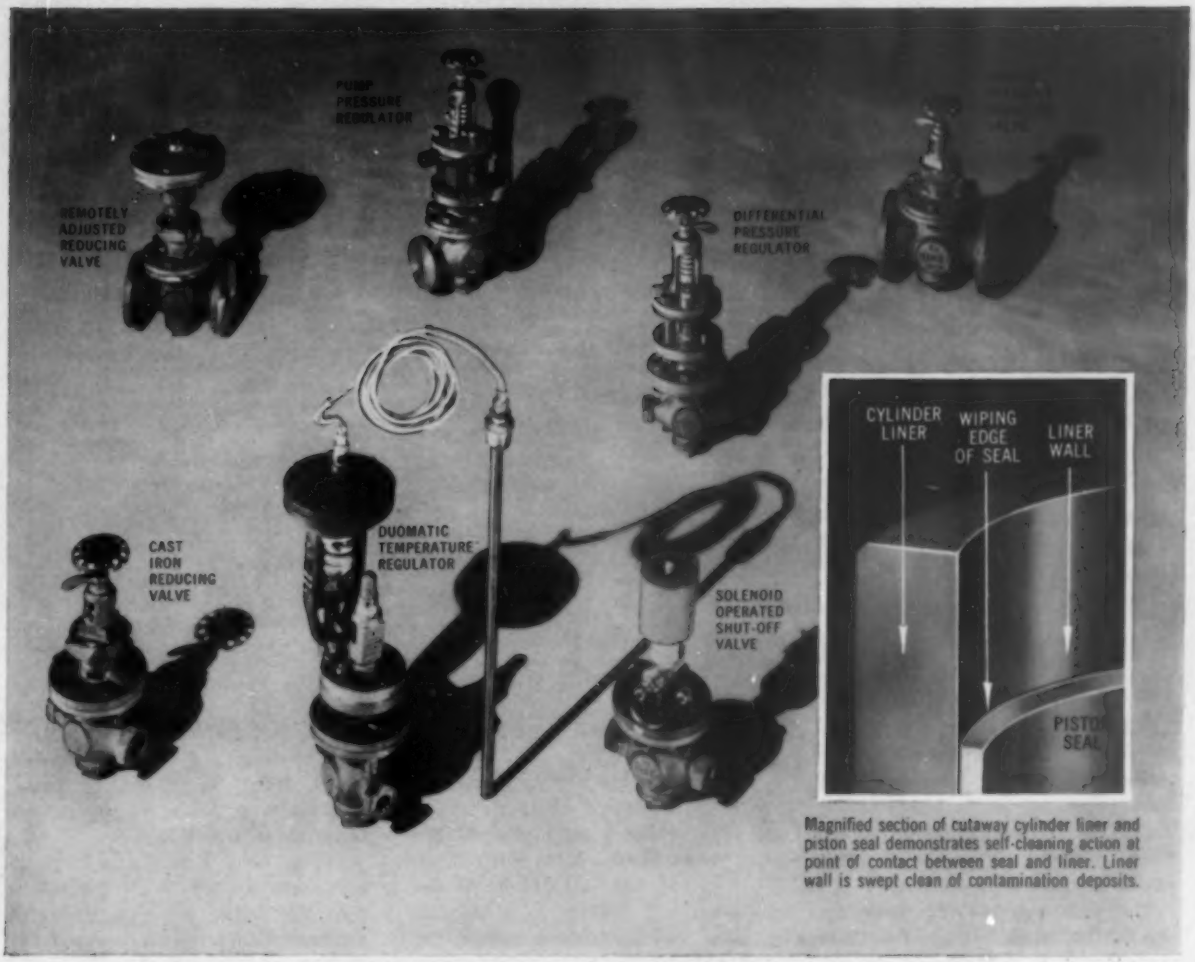
Troubleshooting VIBRATION With Electronics

(*Starts Page* 42)

held seismic pickup with probe which triggers a stroboscopic light, and a lightweight cabinet containing electronic circuits which transmit vibration information gathered by the pick-up to panel meters showing displacement and frequency. A variable filter also can be included to selectively tune to any or all frequencies present in the mechanized system. Various models are available and are applied in frequency ranges of 300 to 160,000 rpm.

The vibration analyzers measure three fundamental parameters of vibration — displacement, frequency, and phase — which accomplish three important, basic functions on all types of rotating equipment:

1. Measuring the displacements — to determine when permissible vibration tolerances are exceeded.
2. Analyzing or troubleshooting — to locate the faulty components exciting the vibration when tolerances are exceeded.
3. Dynamic balancing — to locate the phase or angle and amount of unbalance, and correct it without costly dismantling.



Magnified section of cutaway cylinder liner and piston seal demonstrates self-cleaning action at point of contact between seal and liner. Liner wall is swept clean of contamination deposits.

. . . another LESLIE Quality First!

REGULATORS WITH SELF-CLEANING PISTONS

. . . at no extra cost

Now it can be told! After 3 years of exhaustive field tests and over 5,000 installations, Leslie announces the standardization of exclusive self-cleaning, pressure sealing pistons for reducing valves, temperature and pressure regulators in ½ to 6" sizes — another Leslie FIRST!

Continuous Wiping Action

The continuous "wiper" action of the new piston's seal keeps the cylinder liner clean, improves reliability, reduces maintenance.

The molded self-lubricating piston seal has already proved itself in high temperature service up to 500°F.

Reduces Wear and Sticking

The resilient cushion between the piston and cylinder liner reduces wear and eliminates "freezing" or sticking of these parts. The self-lubrication and pressure-sealing of the new piston insures smooth, dependable operation even in the toughest applications and where long standby periods are a problem with ordinary regulators.

Fully Interchangeable in Field

You can have this desirable new Leslie FIRST in *any* piston-operated Leslie regulator now in steam service for all temperatures up to 500°F. A quick conversion kit is available and your present Leslie Regulator can have the new seal added in a matter of minutes.

More Information

More data is available — send for these aids without obligation.

Data Sheet RV-51C — Instructions for converting your present Leslie Regulator to self-cleaning piston type
Bulletin 5302-B — Reducing Valves and Pressure Regulators
Bulletin 5307-A — Temperature Regulators

Or ask to see a demonstration model of the new pressure seal piston.

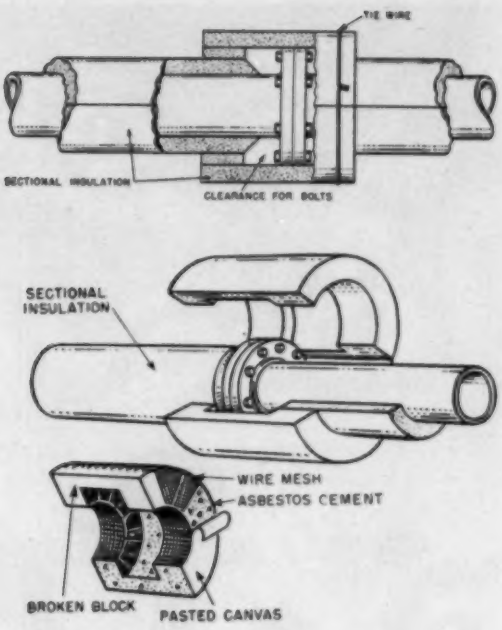
LESLIE REGULATORS and CONTROLLERS

LESLIE CO., 261 Grant Avenue, Lyndhurst, New Jersey

For more information, use Reply Card—Page 83

Anticipate maintenance problems on . . .

INSULATED EQUIPMENT



"Permanent" type flange insulation wired in place (top drawing) can be removed, if necessary, without damage to pipe insulation and high salvage of flange insulation.

"Removable and replaceable" flange insulation, made of broken block on previously shaped wire frame has high labor cost and is economical only on lines requiring frequent maintenance.

ESSENTIAL maintenance of insulated equipment can be accomplished with a minimum of disturbance of, or damage to, the insulation if the insulation is applied initially with the maintenance problems anticipated.

The extent to which insulation should be made removable and replaceable is determined by the relatively simple economics of the original cost of so constructing the insulation as compared with the cost of partial replacement of insulation when "permanent" application techniques are employed.

Those Labor Costs

For example, it was sometimes a practice to use removable and replaceable flange insulation on fittings and bolted flanges throughout an entire piping system. Because labor costs have risen more rapidly than material costs, the economy of this technique is highly questionable on lines which require only occasional maintenance. In this method of insulating, each flange cover must either be made of block material formed over a wire lath matrix, secured with wire and finished with insulating cement, or, when flange size permits, formed from hinged pipe insulation sections. This on-the-job fabrication is costly and seldom warranted under today's labor costs.

Bolted flanges can be insulated with conventional methods so as to leave flanges readily available for disassembly and with high salvage of the insulation to be removed.

The method recommended by the Magnesia - Silica Insulation Manufacturers Association and for use with 85% Magnesia, calcium silicate, expanded silica or diatomaceous silica insulations, is efficient and economical. The ends of the pipe insulation adjacent to the bolt head side of the flange are beveled back to permit the use of a wrench on the bolt heads without damage to the pipe insulation.

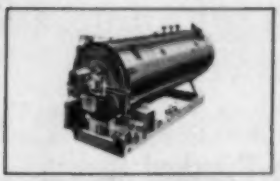
Where the OD of the flange is 12-in. or less, pipe insulation sections can be used (some pipe insulation comes in larger ID). The section to be applied over the flange is cut to overlap adjacent pipe insulation by at least two inches. If the ID of the flange insulation is greater than the OD of the pipe insulation, the void is filled with rings of appropriate size pipe insulation. The insulation is secured in place with the wires on either side of the flange and finished with the same materials as adjacent pipe insulation. On larger flanges, block insulation may be used and cut and mitered to fit, hard finish cement being applied to provide a smooth surface where necessary.

While it will probably be necessary to replace the finish when the insulation is removed for maintenance purposes, reasonably careful handling will permit the re-use of the insulation itself. In any event, it is doubtful whether the replacement of the insulation would exceed the cost of using removable and replaceable flange insulation in the first place.

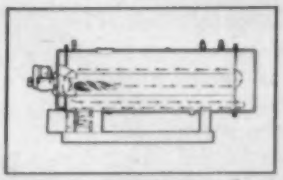
Manhole Insulation

Another major area of maintenance of insulated equipment is manholes or other access openings. In many cases where temperatures do not create excessive heat losses or personnel hazards, manhole covers are left uninsulated. In other cases, it may be desirable to use a tailored asbestos blanket secured to pre-fixed anchors around the manhole. In either case, the insulation around the manhole or other opening should be beveled back and the beveled edge protected with a sheet metal or band cover. The use of heavy maintenance tools or actual entry through the manhole may damage exposed insula-

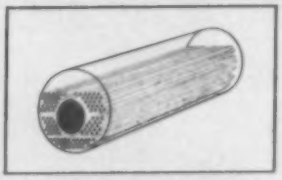
NOW . . . all these "BIG BOILER" features in a compact, economical package . . .



● **A complete package** including boiler burner, draft equipment, controls and all interconnecting piping and wiring. Completely assembled and factory fire-tested.

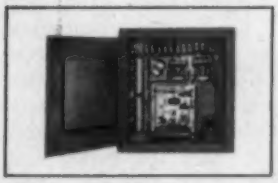


● **4-pass down-draft design,** promotes rapid water circulation. Decreasing tube volume in successive passes provides high combustion gas velocities and maximum heat transfer.

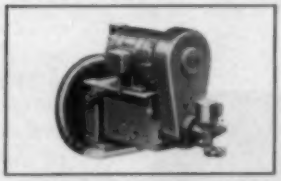


● **5 sq. ft.** of heating surface per b.h.p. Units reach conservative ratings with ease. Guaranteed thermal efficiency 80%. Stack temperatures not exceeding 125° above steam or water.

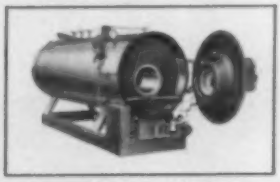
● **Induced draft** operating at relatively slow speed results in unusual quiet plus safety from danger of forcing gases out into boiler room. Negative furnace pressure also protects refractory.



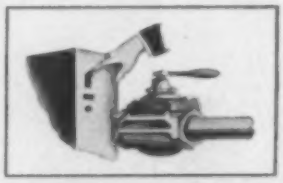
● **Fully automatic** operation firing oil, gas or both. Firing rate adjusts to demand, never overfiring wastefully, but handling sudden increases without lag. Variety of controls available.



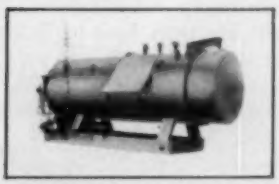
● **Superior Rotary Burners** on all sizes firing No. 4, 5 and 6 oil. Most dependable type of equipment ever devised for burning heavy oils. Burners require minimum supervision, and no lubrication.



● **Hinged** front and hinged or davited rear door on all units. Doors may be opened simply without removing refractory and are simply and effectively sealed with standard asbestos rope.



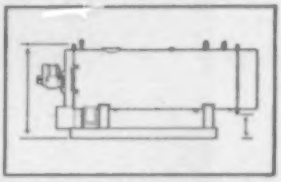
● **Instantaneous fuel change-over.** Units equipped for oil and gas firing may be changed from one fuel to another quickly and simply by operating only a switch and a valve.



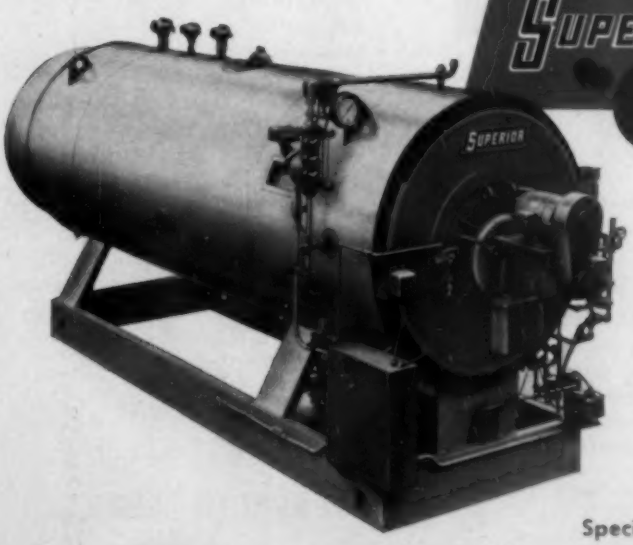
● **Completely insulated** and jacketed. Even the bottom of the boiler shell is covered with 2" insulation. No uninsulated areas for heat loss and unnecessary heating of the boiler room.

● **Down-draft design** places furnace high in shell, safely away from danger zone . . . completely eliminates bagging and blistering resulting from mud build-up in bottom of boiler.

● **Constant gas pilot** remains lit at all times, prevents accumulation of gas in the furnace which could result from even an almost undetectable leak in the gas valve.



● **Low total height** but with clearance from floor allows ample room under the shell for inspection, maintenance and installation of piping. The COMPACT is practical as well as compact.



SUPERIOR "COMPACT"

Here at last is a boiler which combines all of the most desirable features of big boiler design with an unusual degree of compactness. Ideal for installations where space is limited, it also provides an economical answer both from the standpoint of purchase and installation costs for any application having steam requirements of from 20 to 200 B.H.P.

Pressures to 250 psi, or hot water units also available. Write today for Bulletin 1011C

SUPERIOR COMBUSTION INDUSTRIES INC.
TIMES TOWER, TIMES SQUARE, NEW YORK 36, N.Y.

Specialists in **PACKAGED BOILERS** . . . exclusively

For more information, use Reply Card—Page 83

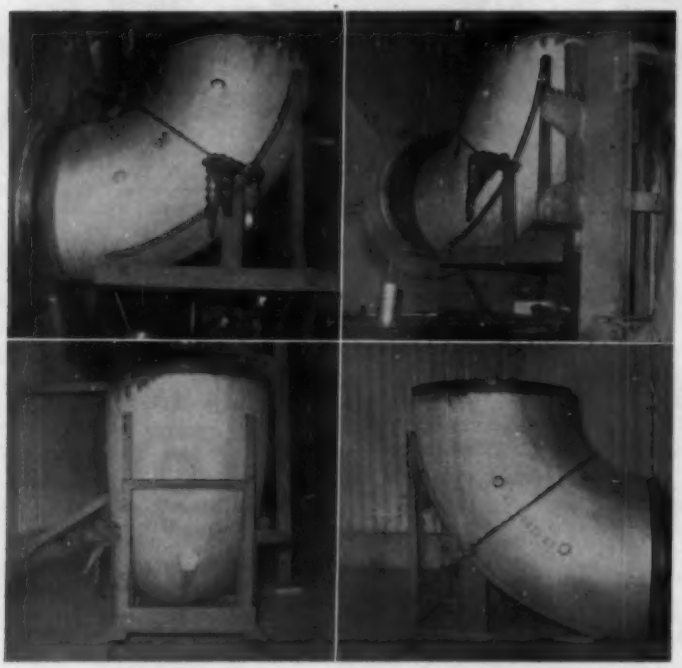
Maintaining Insulated Equipment — Contd.

tion. Heat exchanger covers and similar items are frequently insulated on the inside with blocks secured to anchors so that the insulated unit may be removed and replaced intact without disturbing the insulation.

Accessibility

Overall plant design should allow for the insulation factor in maintenance work. In effecting space economy, pipe lines are often placed so close to each other or to walls, ceilings or equipment, that there is barely room to apply the necessary insulation thickness let alone provide for future maintenance.

The same applies to equipment units. With operating temperatures being increased constantly, insulation thickness are being increased accordingly with three- or four-inch thicknesses quite common. This means that the OD of a pipeline is increased by the insulation up to 8-in., a considerable factor in piping design and layout. Inaccessibility to any part of insulated piping or equipment can cause serious and costly delays on maintenance.



Exhauster Elbow Cradle

WE HAD quite a problem in removing a 28-in. exhauster elbow from our Combustion Engineering — Raymond Bowl Mills. The elbow is very heavy and there is no way to get a direct hold on it from above the bowl mill.

Photos show a specially designed cradle which enables us to easily and safely remove the elbow. Cradle fits on the legs of a fork truck and the elbow is held in place in the cradle by means of a small hand operated chain hoist. Top photos show fork truck in position. Lower photos offer end and side views of the cradle, with elbow resting on the concrete floor. The cradle design has been a big time saver in our maintenance operations.

By ALVA E. CRUMP, JR., Louis V. Sutton Plant, Carolina Power & Light Co., Wilmington, N. C.

Pre-Punched Cards Control Maintenance

(*Starts Page* 47)

hour) all withdrawal cards are collected from the "outgoing boxes" and delivered to the IBM (3 blocks away). The IBM operator can now punch in the quantity and charge number from the pencil notation, sort the cards, and print a list of all material withdrawn from stock during the past 24 hours. This list is then checked against the stock book which shows minimum stock to keep on hand, and replacements are ordered accordingly.

All cards are then filed in IBM tub files and can be pulled at any time for an inventory report. An annual report is printed at the close of the fiscal year and put in a bound volume for a permanent record. Some seventeen different kinds of records can be pulled from these cards, sometimes very necessary in making out reports.

For this company, Preventive Maintenance depends largely on having the necessary parts on hand and quickly available to the men. This cuts downtime of cranes and other vital equipment to a minimum. Also, the past years' records, clearly indicate what parts are being used in excessive quantities and which machines are requiring excessive replacement of parts. From this information and labor costs (which are similarly recorded) constructive recommendations can be made to change the design or replace with newer, heavier duty equipment.

"SPANG Steel Pipe gave us clean, tight welds... assuring long, efficient service"

says Mr. Lawrence F. Carella, Superintendent, Crane Plumbing & Heating Company, Cambridge, Mass.

"The air conditioning system for the United Shoe Corporation Building, Boston, required 2,000 weldments, accounting for 50% of our working time," reports Mr. Carella. "Thanks to SPANG Steel Pipe, many installation difficulties were eliminated."

SPANG PIPE REDUCES EXTRA WORK

"SPANG Steel Pipe always gave us a true end cut, and the inner walls contained no dirt or scale. Also important, to make this air conditioning work at peak efficiency, the welded joints must be absolutely tight—without the use of caulking. The clean, tight welds we got with SPANG Pipe mean long, efficient service on this job."

SPECIFY SPANG FOR YOUR NEXT JOB

You, too, can get the same top-quality performance with SPANG. And your local SPANG Distributor will give you top-quality service on your order. You'll get a superior-grade pipe manufactured under strict *quality-controlled* methods.

Next job—make it steel pipe . . . make it SPANG!

SPANG-CHALFANT
DIVISION OF THE NATIONAL SUPPLY COMPANY
General Sales Offices:
Two Gateway Center, Pittsburgh, Pa.

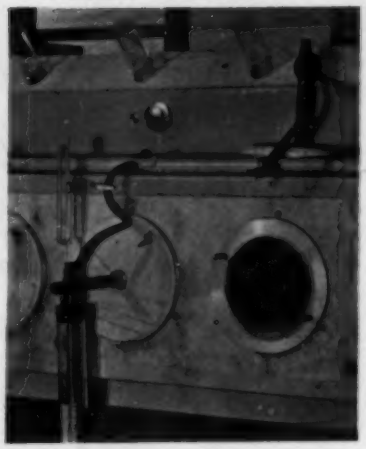
SPANG®
CW STEEL PIPE

Mr. Carella states that SPANG Steel Pipe made this installation "quicker and easier," and that the interior walls of the SPANG Pipe were free of dirt and scale.

Engineer:
A. Ehrenzeller, Inc.
Boston, Mass.

Mechanical Contractor:
Crane Plumbing & Heating Co., Cambridge, Mass.

SPANG Distributor:
Charles D. Sheehy, Inc.
South Boston, Mass.



Silicone O-Rings Can Take the Heat

DO YOU have a sealing problem complicated by operating temperatures that quickly destroy the effectiveness of organic rubber seals? Here's how Core Laboratories Inc., Dallas, has solved such a problem by using O-rings made of Silastic, the Dow Corning silicone rubber that retains its properties from —130 to over 500 F.

Core Laboratories employ vacuum retorts in determining oil and water saturations of whole core rock samples. High vacuum techniques are employed to achieve complete retorting at temperatures ranging up to 500 F.

A critical point in the apparatus is the seal between the retort pots and lids. Organic rubber gaskets or O-rings provide a satisfactory seal against vacuum leaks but they soon deteriorate at the elevated operating temperatures. O-rings made of Silastic have proved to be the only practical solution to this high temperature sealing problem.

The O-ring is not held in the usual groove in this application because it was felt that compression set is unavoidable and leaks might develop. Hence, the O-ring is clamped between two nearly flat flange halves and subjected to pressure of about 500 lb/sq in.

Core samples are heated under a vacuum of 2 or 3 mm Hg for periods up to 6 hours at 400 to 500 F while oil and water are taken off. During this operation,

the O-rings are exposed to hydrocarbons, sulfur and other corrosive compounds typical of petroleum-bearing formations. Even under these extremely adverse conditions, O-rings made of Silastic are reported to last for 30 or more runs.

Don't "Short-Change" Machine Maintenance

IF MACHINE tool users would make a concentrated effort to tighten up on machine maintenance, they could help arrest rising costs of both production and capital equipment, in the opinion of field engineers of Wickes Corp.'s Machine Tool Division.

When it comes to a $4,000 automobile, they say, few persons lose any time in getting it to the grease rack every 1,000 miles — just like it says in the manual.

But when it comes to a $400,000 machine, the manual is thrown out the window, and every effort is made to get out of the machine every ounce of production — nonstop, 24 hours a day.

The same persons driving autos would never dream of kicking out the oil indicators of their cars. Yet, these same people are literally doing that to their machine tools.

At least 43% of a machine tool builder's problems after delivering a new machine, Wickes trouble shooters point out, still stem from "short-changing" preventive maintenance jobs — minor tasks which take only minutes, and could help increase machine life thousands of hours, reduce production downtime, and speed up the write-off of the machine.

Take the matter of lubrication, for example. Most machine tool builders design an automatic lubricating system right in the machine, and equip them with telltale lights.

But in many cases, where burned out bearings were involved, the Saginaw, Mich. representatives found that the warning lights were deliberately disconnected to keep the operators producing.

New Epoxy Paints Solve Tough Problem

Maintenance Painting Power Transformers in Service

By T. J. EBERHARDT
Vice President
Subox Inc.

PAINTING of large air-cooled power transformers has long been a problem for electric utilities. These companies have devised plans and methods of flow-coating paint over the complicated cooling fins whereby service interruptions are held to an absolute minimum.

Flow coating is a process of pumping the paint to the top of the transformer and letting it flow down the fins until all areas are covered. To perform this task, scaffolds, pumps, strainers, etc. are required. This equipment is all assembled and placed in position while the transformer remains in steady operation. It is only during the actual painting operation, which requires from 20 - 30 minutes per coat of paint, that the transformer is de-energized. A similar period may also be required for the painting of the tops and around the bushings.

Better Coatings Available

For over a quarter of a century, Subox Inc. has specialized in the manufacture of suitable transformer paints and finishes. These have been applied by this flow coating method with excellent success. Now however, new developments in the epoxy resin formulations have enabled these more chemical resistant coatings to also be applied by this flow-on method.

Recent inspections at some of the most chemically contaminated areas in Virginia, West Virginia and North Carolina show definite improved life of these coatings as compared to the old standards. The coatings based on these newer resins have the same color and finish as specified by American Standards Association for proper heat transfer and can be used interchangeably with other transformer finishes.

Some of the transformers inspected are now in their third exposure year. While some of the units have heavy encrustations of chemical deposits over the painted surface, these deposits, when removed, show the paint film intact and the protection furnished by them to be perfect. As these results have been so satisfactory, these same paints are being applied to other metal surfaces by these same industries in regular maintenance work.

When privately owned electric substations require painting, most of the owners are faced with an unfamiliar problem. To de-energize the equipment may require a full plant shut-down. To clean chemical deposits, old paint, and rust from these complicated cooling fins is time consuming and difficult unless accomplished by satisfactory chemical agents. To then neutralize the metal surfaces and to repaint in a manner that will produce efficient operating temperatures requires a much different technique than that of other ordinary painting.

To help solve these problems, Subox Inc. offers the services of a field engineer on a lend-lease basis to private industries. This man not only helps his client assemble the necessary tools and equipment, but also actually trains that company's crews to do the necessary work efficiently and economically.

Texas maintenance engineer tells . . .

How to Tighten Six-Inch Studs

REMOVING the head from a pressure vessel bolted in place with sixteen six-inch diameter studs used to be quite a maintenance headache at the Texas City plant of the Union Carbide Chemicals Company.

Every time the vessel was taken out of service and the head removed you could count on about 100 hours downtime for just loosening the bolts, regrinding the nuts and washers and putting them back on.

Under the old system, tightening the nuts and washers on just one head took four men nearly ten hours. With clean lubricated threads the nuts can be run on by hand but a three-foot impact wrench applying a force between 7,000 and 18,000 pounds is needed to tighten each nut. The nuts should be tightened until the studs are elongated .020 inch, but often elongation was irregular.

The bottom of each nut has a convex surface ground on it and the top of the matching washer, which is checked by using Prussian Blue, has a concave surface on it. Both the nuts and washers are made of alloy steel and must stand operating temperatures ranging from 90 to 150 degree centrigrade.

Each time the head was taken off, the nuts and washers were found to be badly galled and had to be reground. This accounted for nearly half of the downtime.

To save man-hours and downtime on this job it was necessary to speed up the tightening and loosening and try to eliminate the regrinding.

First lubrication of the threads between the nuts and the washer was necessary. A high pressure-high temperature lubricant was required and molybdenum disulfide seemed to be the answer. It was mixed to a thick workable paste with four different ingredients. An extreme pressure lube, a high temperature grease, Varsol and Ucon were all tried. However, since initial trial only Ucon has been used as a carrier. The others were satisfactory but the paste of molybdenum disulfide and Ucon was the most convenient to make up and use.

Also since the nut and washer act somewhat like a sleeve bearing and shaft, it was reasoned that the bearing surfaces should be made unalike. The washers being the easier of the two to work with were chosen to be treated.

Each washer was hardened and drawn to 40 Rc. Several different surfaces were used on the washers. Some were plated with .020 inch hard chrome. Others had a nickel-chromium-boron fused on them and the remaining washers were sprayed with a coating of molybdenum. After the surface treatments, washers were ground and matched to the nuts.

Since these two steps were taken the average time for tightening the bolts on one head is four hours. None of the washers or nuts have had to be ground over, stud elongation is uniform, and the nuts can easily be run off by hand once they are loosened.

Average number of man-hours now required to remove and replace a head is 22. A saving of almost 80 man-hours over the previous method.

By P. S. HOWERTON, Maintenance Engineer, Union Carbide Chemicals Company, Texas City, Texas.

Ramp-Dock Solves Underclearance Problem

A PROBLEM of underclearance on the shipping dock of the Century Electric Company, St. Louis, Missouri, manufacturer of electric motors and generators, was neatly solved by the use of a magnesium combination ramp-dock board. Low underclearance on their walkie trucks plus a larger than average height differential between the dock and carrier, prevented use of a standard dock board.

The ramp section rests on the dock and is permanently elevated at other end.

To handle the eight-inch height differential, an ordinary board would have too large a crown to permit travel of low underclearance walkie trucks. On the other hand, a long ramp suitable for low underclearance trucks would be bulky and hard to handle.

The use of this combination ramp-dock board, manufactured by the Lite-Line Industries Division of Copperloy Corporation, Cleveland, Ohio, provides an efficient solution. Built in two separate parts and fabricated from lightweight magnesium, it can be easily moved and positioned by one man. It provides the long gentle slope demanded by low underclearance equipment and since the parts can be easily separated, the dock board can be used independently at other locations where excessive height differential is not a factor.

Small Regulator Does Many Jobs!

FISHER

TYPE 95

Available in 5 sizes from ¼" to 1" for steam, gas, oil, water and other fluids

TYPE 95L with iron body and composition disc or stainless steel trim. For outlet pressures from 2 to 30 psi.

TYPE 95H available in cast steel or iron bodies for outlet pressures up to 150 psi.

Small Size, Large Capacity, Ideal for Limited Space Jobs

As usual, Fisher engineers have packed this small but mighty regulator with a number of outstanding features.

A. Installation is quick and easy, no external lines, piping or connections.

B. Extremely stable because diaphragm is located in isolated chamber out of the flow stream. No fluid velocity impingement possible.

C. Positive two-point guiding for stem assures smooth action and perfect alignment.

D. Higher capacity results from utilizing downstream pressure through a small registration tube located to produce a velocity boost action. Holds more constant pressure over a wide flow range.

Another outstanding feature is ready accessibility of all parts. Cleaning or inspection is quickly accomplished with simple tools and without removal from the line. Even the diaphragm may be replaced without disturbing the inner valve or orifice.

FOR COMPLETE DATA WRITE FOR BULLETIN C-95

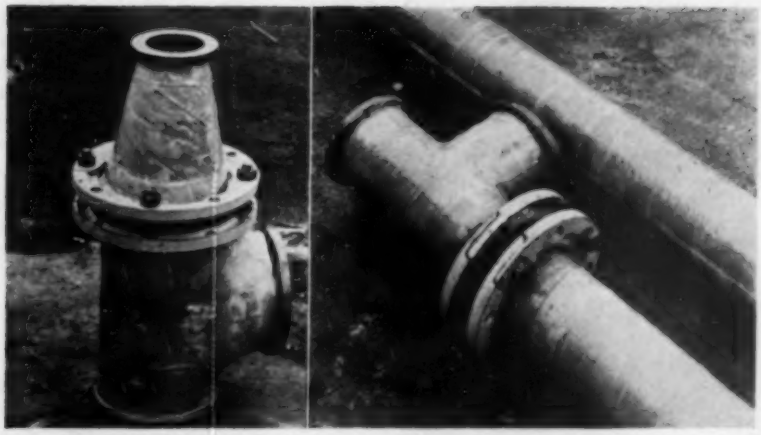
IF IT FLOWS THROUGH PIPE ANYWHERE IN THE WORLD... CHANCES ARE IT'S CONTROLLED BY...

FISHER GOVERNOR COMPANY

Marshalltown, Iowa / Woodstock, Canada / London, England

FISHER® Controls

SINCE 1880



South Charleston, West Virginia . . .

Special Plastic Pipe Coating

A PROTECTIVE plastic coating has been developed for use on acid-carrying pipe lines by Carbide and Carbon Chemicals Company in cooperation with Bakelite Company, both Divisions of Union Carbide and Carbon Corporation. The coating consists of a spirally wrapped glass-cloth tape bonded to pipe, fittings, and valves with Bakelite epoxy resin.

To minimize heat losses from the finished line, a ¾-in. thickness of asphalt can be applied over the plastic; and where maximum chemical resistance is needed, an additional wrapping of synthetic fabric tape can be bonded with epoxy resin over the glass-cloth wrapping.

The new coating was developed for use on Duriron pipe at the South Charleston, W. Va., plant of Carbide and Carbon Chemicals Company. Duriron is a high silicone iron alloy fabricated by Duriron Company.

The coating serves as a mechanical reinforcement for the pipe, and can withstand the corrosive attack of chemicals or fumes which might escape from damaged pipe or adjacent equipment.

At South Charleston, the new coating is used on a 100 ft long transfer line which carries alcohol and strong sulfuric acid at 70 C to 100 C through 4-in. pipe at low pressure. If the contents of this line were to escape, they would present a serious fire and personnel hazard. To apply a coating on such a line, the surfaces of the pipe are first cleaned by sandblasting and then a brush coat of epoxy resin is applied. When the coating has dried to a tacky state, a three-inch wide tape of glass cloth is wrapped around the pipe several times. After the tape is in place, a second coat of epoxy resin is brushed well into the fabric and allowed to dry in the air until hard to the touch. It is then cured in an oven at 90 C for four to six hours.

Bakelite epoxy resin was chosen because of its excellent adhesion to glass as well as its toughness and resistance to impact.

Checking Rewound Motor

THE MAINTENANCE shop in one plant that rewinds its own motors makes a fast check on such jobs prior to reassembly by placing a roller bearing inside the stator (see photo), then applying the "juice" momentarily to the stator.

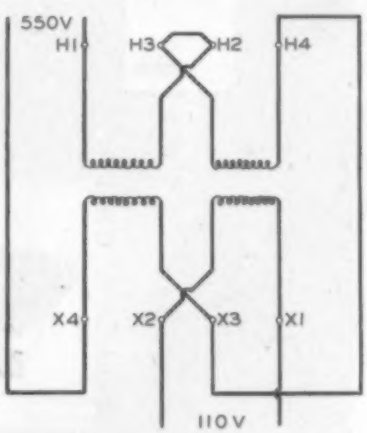
If all's well, the bearing will race around the interior of the stator. If winding is wrongly connected, shorted, opened, etc., the bearing will stand still.

By HARRY J. MILLER
Sarasota, Fla.

Transformer Connection

HERE is a transformer connection that worked very well. A small control transformer with 550 volt primary was needed in a hurry. There was none in stock, but we did have a 100 volt-ampere transformer with dual primary and secondary windings (220-440) to (110-220) volts.

As shown in the diagram, one-half of the secondary was connected in series with the primary. After the connections are made,



polarity should be checked. This can be done by connecting 110 volts to X1 and X2 of the secondary, and take a voltage reading between H1 and X4.

If the reading is not 550 volts, but between 300 and 400 volts,

interchange X4 and X3; that is, connect X4 to H4 and use X3 as one side of the line. The voltage reading between X3 and H1 should then be 550 volts.

By ROY HOBBS, Oronogo, Mo.

Higher Voltage Cheaper

ADDITIONAL machinery on order for the expanded operation of our plant confronted us with the problem of supplying electrical power to these machines even though our present electrical distribution system was already taxed to the limit.

Our problems resolved themselves into the following:

1. Adding additional primary distribution panels and paralleling each of our five main distribution "feeders" on our present 240 Volt a-c, 3 Phase system.
2. Converting plant voltage system to 575 Volt a-c, 3 Phase system.
3. Converting plant voltage system to 480 Volt a-c, 3 Phase system.

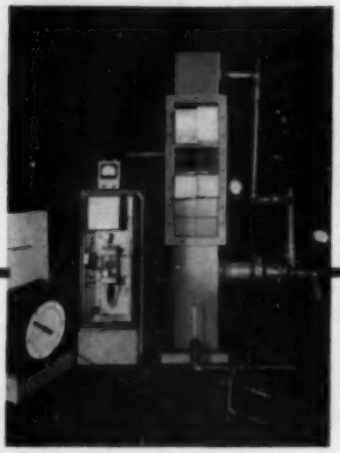
While it was readily apparent that the 575 volt system would allow the maximum future expansion, using the present distribution system, the large number of dual voltage motors (220/440) already in operation quickly ruled out possibility number 2.

A detailed economic survey was then made of all costs involved (labor costs estimated) for possibility (1) versus possibility (3).

Final cost tabulations proved that the cost of conversion of the plant electrical system from 240 to 480 would be approximately 15% less than the total cost involved in adding primary distribution panels and paralleling each feeder.

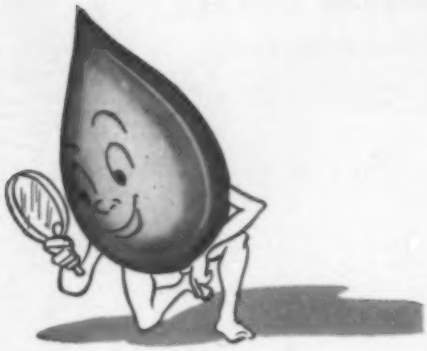
Also considered, but not entered into the cost picture, were the cost of power factor correction capacitors. On a 480 volt system the capacitors would amortize themselves in one-half the time of amortization on a 240 volt system.

By M. H. DORSEY, Plant Engineer, Hazelhurst Mills, Hazelhurst, Ga.

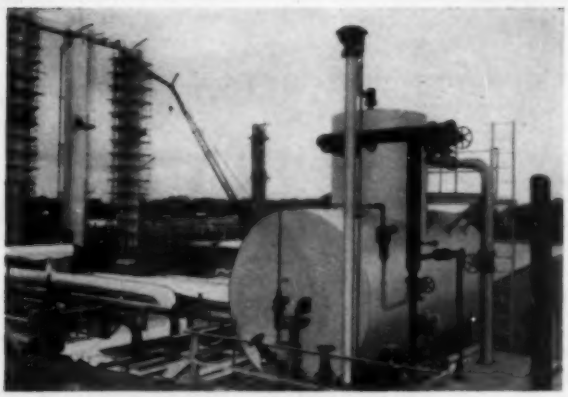


Pilot tray-type deaerator shown with continuous oxygen analyzer in test setup.

ALLIS-CHALMERS DEAERATORS



Looking for more effective deaeration?



Outdoor installation of Allis-Chalmers deaerator in southern chemical plant.

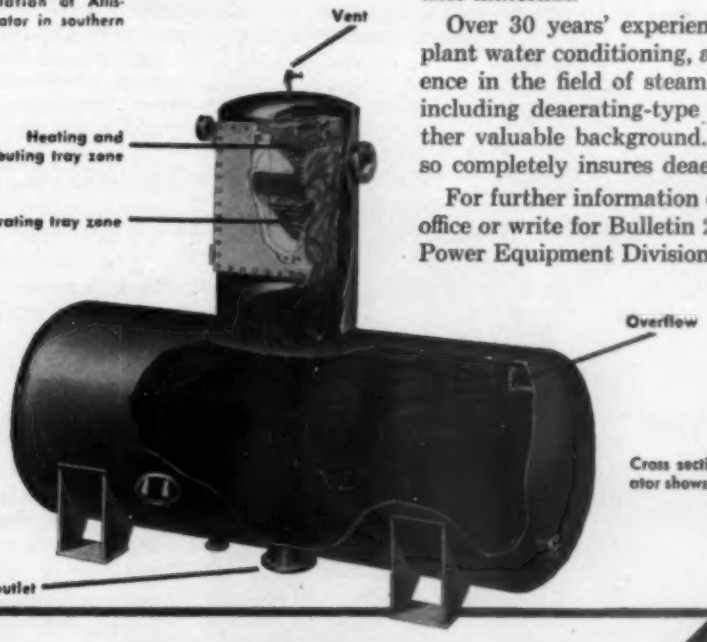
● If so — you'll be interested in the continuing research program at Allis-Chalmers to evaluate all factors in the design of deaerators.

This program includes the use of a specially built pilot deaerator with automatic oxygen analyzer and recorder. Operating factors and deaerating compartment design can be varied to study length of spilling edge of trays, heating area and method of flow. Results obtained with this setup are quickly translated into deaerators designed for optimum performance.

In addition to this continuous testing, metallurgical research is being done to select the most suitable materials.

Over 30 years' experience in the field of power plant water conditioning, and over 75 years' experience in the field of steam power plant equipment including deaerating-type condensers, provide further valuable background. No other manufacturer so completely insures deaerator performance.

For further information contact your nearby A-C office or write for Bulletin 28B8853, Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wis.



Cross section of tray-type deaerator shows water and steam flow.

ALLIS-CHALMERS

A-5474

Employees in this plant have equipment and know-how to use it

PLANT FIRE DEPARTMENT

By FRED B. CURTO
Plant Maintenance Supervisor
Specialty Control Department
General Electric Company
Waynesboro, Virginia

FIGHTING FIRE has developed into an exacting science with the coming of many new types of explosives, with various kinds of flammable liquids and materials, and with the always present carelessness of people. Fire fighting no longer means just pouring water onto burning materials.

From the design to the shipping of our products we base our planning on the fact that we must continue to produce and maintain a fire prevention program to avoid any unnecessary business interruptions.

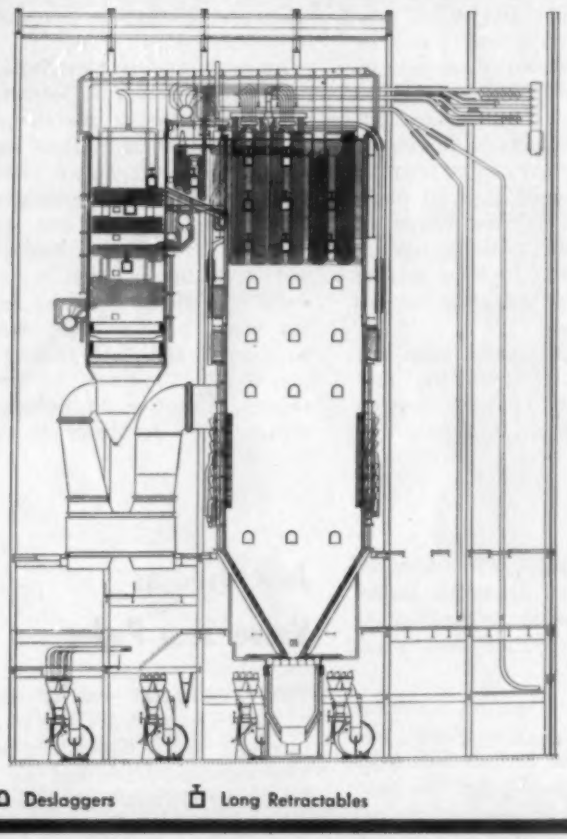
Firemen have to instruct other firemen. They have to inform others on fire prevention and methods of fire fighting. To accomplish these objectives, individual training becomes an important factor. We at General Electric Company's Specialty Control Department, Waynesboro, Va., with approximately 1,000 employees, do not lose sight of these objectives.

The National Board of Fire Underwriters recently completed a study of 662 fires of over $100,000. There are many reasons why fires spread and become large ones, and "delayed discovery" of a fire accounted for 423. It also revealed that 99 out of 100 fires would never exist if the **HUMAN ELEMENT DID NOT FAIL.**

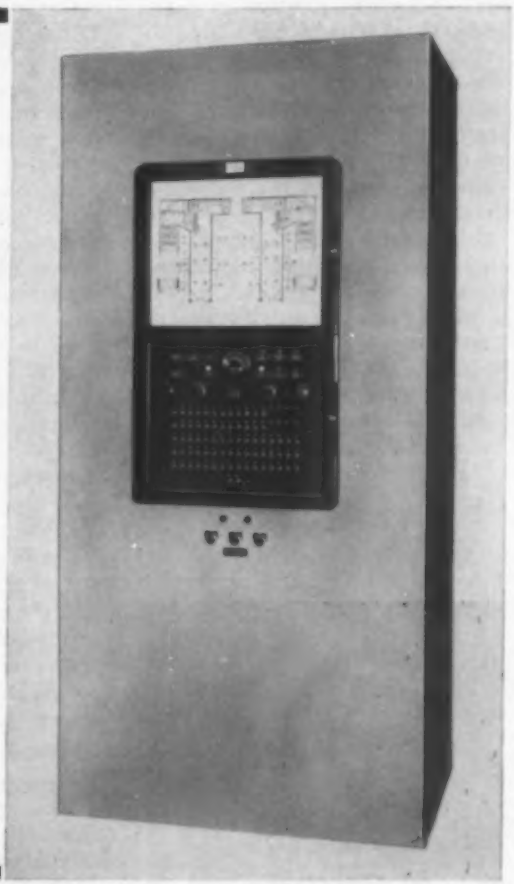
From the early part of 1955, when the plant was built until the last day of 1957, our department has gone through an outstanding record of 1,065 days without a reportable fire and 5,806,886 hours without a lost time accident.

(Continued on Page 72)

How Copes-Vulcan control systems boost power plant efficiency



Showcase super-critical steam generator will be equipped with a Selective-Sequence System that includes Vulcan T-30 long retractables with 30 to 37-foot travels, half 'tracts with 19-foot travels. Wall desloggers and air-preheater cleaner controls will also be used.



Nerve center for precision boiler cleaning, the SSC-120 Selective-Sequence Controller is pre-wired and factory assembled for positive control. It handles up to four cycles for each blower. A 60-station model is also available.

Vulcan soot blowing system saves steam, air and manpower

A Vulcan Selective-Sequence System gives the operator the ultimate in finger tip control of *individual* soot blowers. He can set up a sequence to assure thorough boiler cleaning and forget it. He can monitor the program at a glance, stop it, restart it or change any soot blower from any point in the sequence to another to improve cleaning or conserve the blowing medium. Here's complete flexibility without extensive time consuming wiring and piping changes.

Besides Selective-Sequence, Vulcan also builds Automatic-Sequential Systems that can use steam and/or air without a change in equipment, and can provide both simple automatic or manual control.

A complete line . . . a complete service

Over 50 years of design experience backs Copes-Vulcan's broad line of control systems for boiler cleaning, combustion, feed water, pressure reducing and desuperheating.

Whether furnished in individual units or integrated into a single system, each installation gets custom design, skilled continuing service. Trained service men help set up a routine inspection-maintenance program . . . . visit each installation periodically.

Bulletin 1029 details Vulcan Automatic Soot Blowing Systems. Write for your copy today.

Copes-Vulcan Division
BLAW-KNOX COMPANY
Erie 4, Pennsylvania

Plant Fire Dept. (Cont'd)

Through good management support, Specialty Control recently added a bright new fire engine to the department. This fire engine was converted from a 4 wheel drive Jeep to a compact unit (see photo) to be put into service wherever fire emergency developed on the property. It is painted a bright red and equipped with sirens, flashing lights, axes, extinguishers, hoses, first aid equipment and salvage equipment plus a 250 gallons per minute centrifugal pump with a 75 gallon reservoir. It is the pride and joy of the Fire Brigade which spent three months of "spare time" building the unit.

In order to maintain an efficient organization, training is the important factor. Each month for approximately one year a surprise fire drill is held assimilating the potential hazards within the plant. The brigade members do not know what problem exists when the alarm sounds until they arrive at the scene. These drills are held in line with fire protection, salvage operation, and emergency first aid.

The use of flammable liquids in an industrial plant can be trouble. Insistence is made that all flammable liquids will be stored in safety cans and properly labeled with its contents. Regular inspections by the fire inspector assures that this is done.

Plant fire protection does not "start and stop" with the Fire Brigade. It is reflected through management down to every employee, with a planned program known as the "Monthly Plant Inspection." The Monthly Plant Inspection was conceived in the early days of operation and the results have been outstanding. Once a month an inspection team comes in at 6:00 P.M.

An evaluation system, deducting points for safety rule infractions, has been devised to rate the plant. The fire chief and plant safety director rate the entire plant in relation to material handling, work areas, fire hazards, and safety hazards. Twenty-five points are deductible for violation in any of these four fields. The area having the worst year to date average wins an "8 Ball." Mandatory display of this "evidence" has proven enough incentive to induce the erring section to "clean house."

Heat resistance and extra horsepower capacity of belts provide solution to tough drive problem.

V-Belt Drive Saves $200 a Year

TANK and plate products are fabricated by Hackney Iron and Steel Company, Enid, Oklahoma. Red hot steel plate, often 36 inches in diameter and up to 2¼ inches thick, is shaped into tank heads on the large hydraulic wheel press shown here.

Several years ago, on a similar press, the hydraulic pump was driven by a flat leather belt from motor to jackshaft. But the belt, located only 18 inches from the hot (1800 F) steel plate being shaped, would stretch, slip, and come off the drive. Tightening the belt only strained the bearings.

When the present press was installed, a Gates engineer recommended V-belts because the drive had to be compact and trouble-free if the press operation was to be timed correctly. Gates Super Vulco Ropes were chosen because extra horsepower capacity would allow lighter weight sheaves, put less strain on the bearings, and have the resistance necessary to withstand constant exposure to nearby intense heat.

Over $200 in savings a year is the result. Mr. Claude King, maintenance superintendent, stated, "Because of the way Gates Super Vulco Ropes have stood up on this and the other three presses, I plan to convert other drives in the plant to Super Vulco Ropes."

Jack Used as Valve Seat Puller

THE PROBLEM was to replace worn valve seats on a plunger type (pot valve) boiler feed pump. The manufacturers had no seat removing devices or suggestions, so we turned to our own personnel. Our maintenance mechanics, Bill Bullington and Lloyd Hicks, worked out the solution with W. L. Whitehead, power house engineer.

The device consists of two adjustable dogs which fit under the valve seat. The seat was pulled out by using a small standard hydraulic jack with proper guides and attachments. The seat was pulled out straight and true in a matter of seconds. A difficult job was definitely made easier.

The dog lips that go under the seat are at the ends of two long sections of flat iron that are made up to a rugged cross-piece at the other end. The head of the jack bears on the center of the cross-piece and its foot bears on a short section of 8" pipe fitted against the pump casting.

By W. J. TOMFORD, Plant Engineer, James E. Stark Co., Memphis, Tennessee.

POWELL

world's largest family of valves

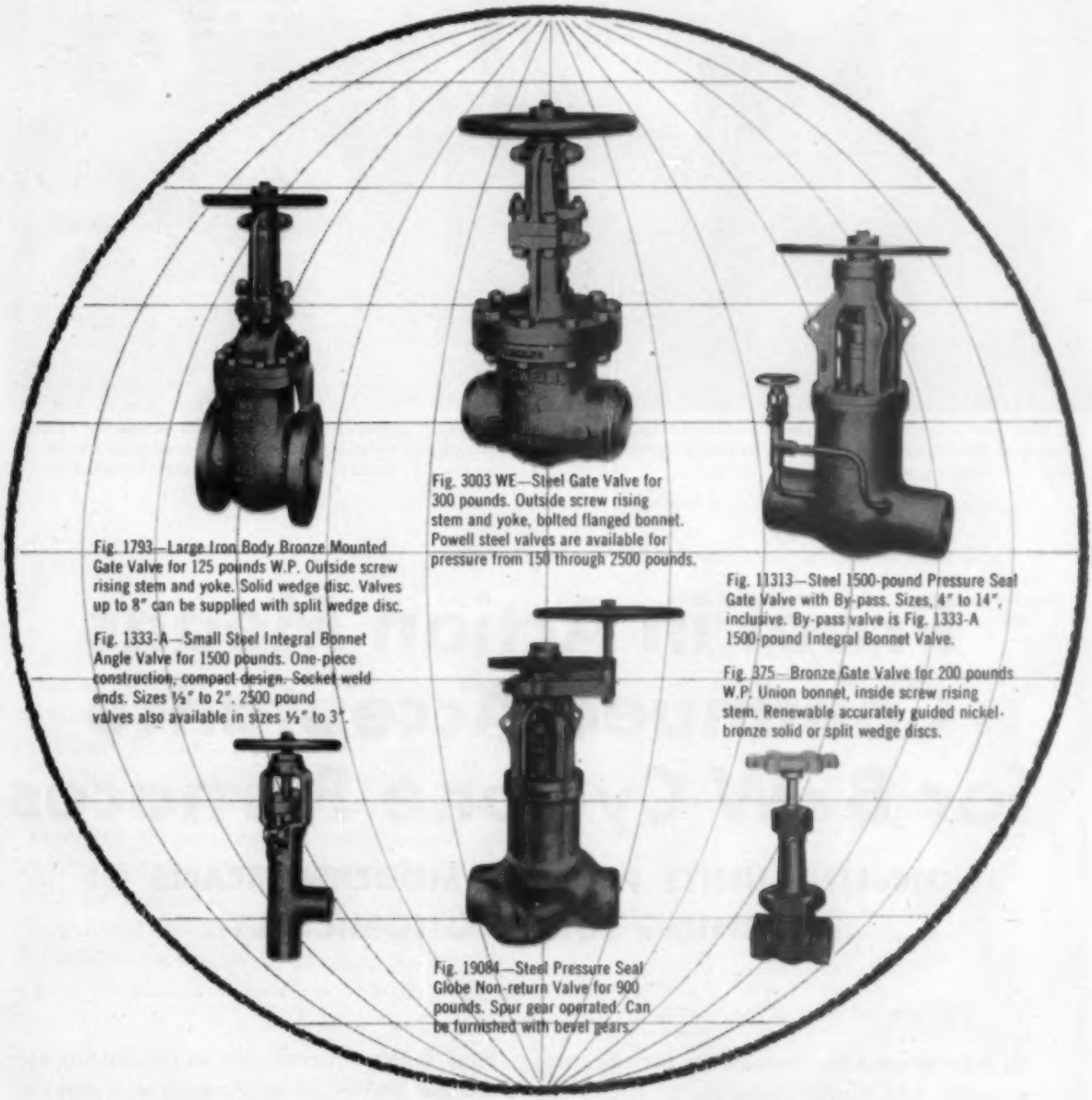


Fig. 1793—Large Iron Body Bronze Mounted Gate Valve for 125 pounds W.P. Outside screw rising stem and yoke. Solid wedge disc. Valves up to 8" can be supplied with split wedge disc.

Fig. 1333-A—Small Steel Integral Bonnet Angle Valve for 1500 pounds. One-piece construction, compact design. Socket weld ends. Sizes ½" to 2". 2500 pound valves also available in sizes ½" to 3".

Fig. 3003 WE—Steel Gate Valve for 300 pounds. Outside screw rising stem and yoke, bolted flanged bonnet. Powell steel valves are available for pressure from 150 through 2500 pounds.

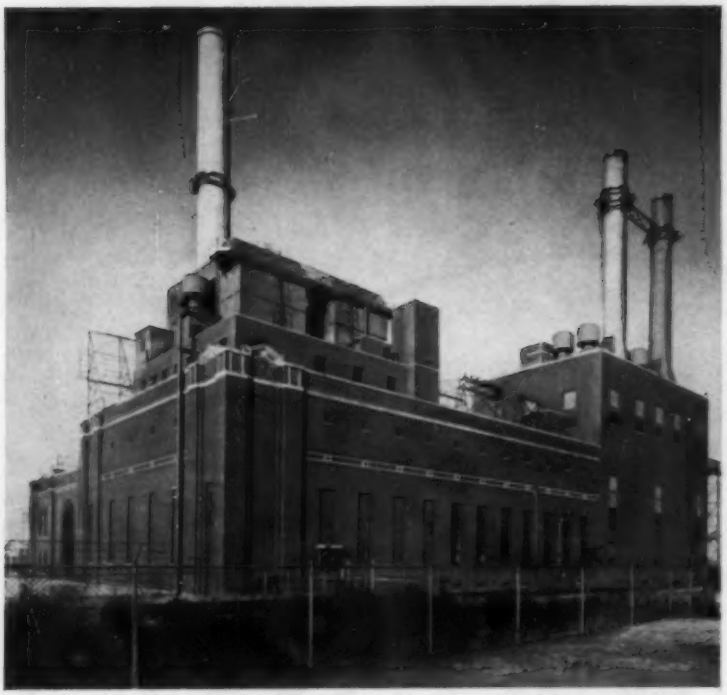
Fig. 19084—Steel Pressure Seal Globe Non-return Valve for 900 pounds. Spur gear operated. Can be furnished with bevel gears.

Fig. 11313—Steel 1500-pound Pressure Seal Gate Valve with By-pass. Sizes, 4" to 14", inclusive. By-pass valve is Fig. 1333-A 1500-pound Integral Bonnet Valve.

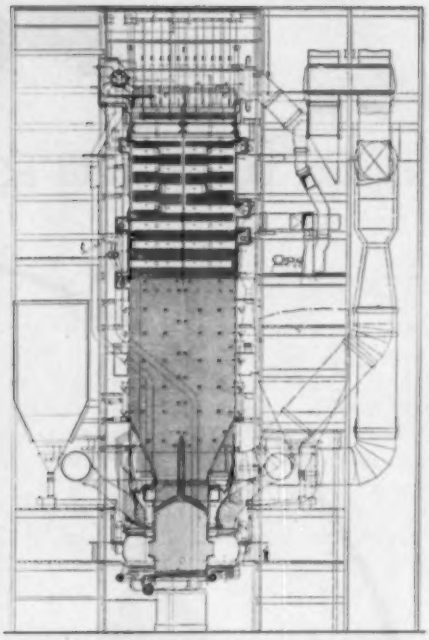
Fig. 375—Bronze Gate Valve for 200 pounds W.P. Union bonnet, inside screw rising stem. Renewable accurately guided nickel-bronze solid or split wedge discs.

A solution for every kind of flow control problem is as near as your local Powell distributor. Powell valves are designed and engineered in the largest variety of metals and alloys, to handle any medium, every flow control requirement. There are Powell distributors in all principal cities. Or, if yours is a special engineering problem, write to:

THE WM. POWELL COMPANY • *Dependable Valves Since 1846* • **Cincinnati 22, Ohio**



On the line for eight years at Commonwealth Edison Company's Joliet Station, 2 B&W Cyclone Furnace Boilers produce 1,200,000 pounds of steam per hour.



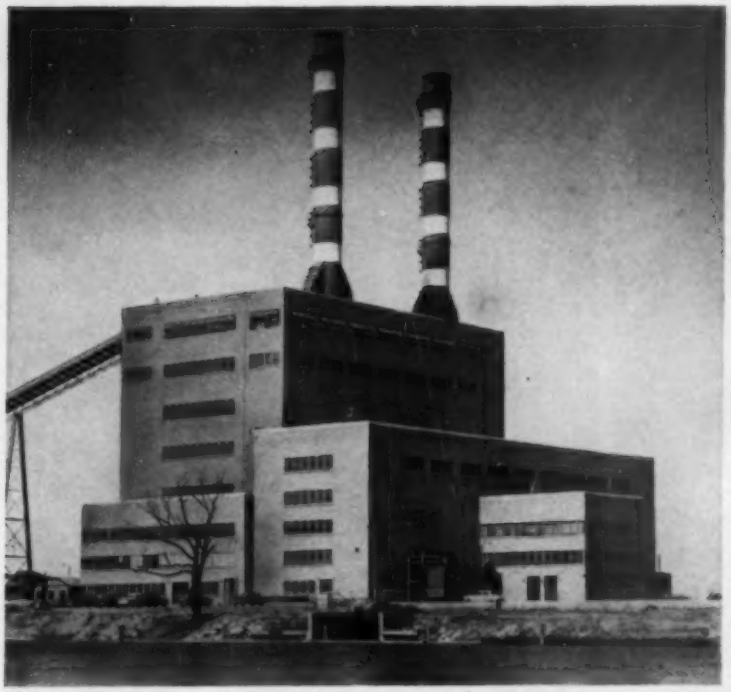
New Cyclone Furnace unit under construction for Joliet Station will generate 2,200,000 pounds of steam per hour. It will burn highly volatile Central Illinois coal with a high ash content and low ash-fusion temperature.

Proof in Action Means Continued Acceptance for B&W Cyclone Furnaces

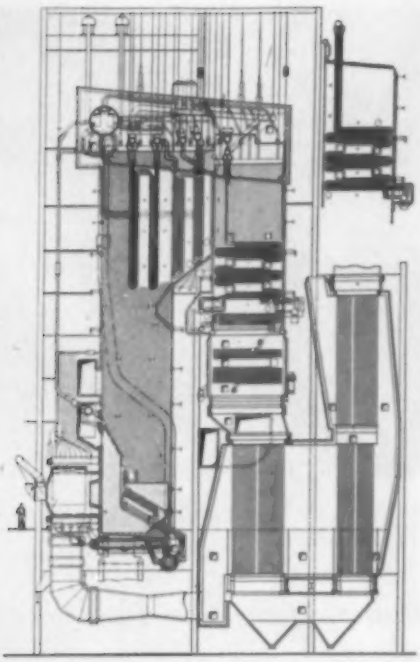
ON-LINE UNITS PROVIDE MODERN MEANS OF BURNING FUEL ECONOMICALLY

In installation after installation, the efficiency, economy and simple operation of B&W Cyclone Furnaces have led to continued acceptance. At the Commonwealth Edison Company, where the first Cyclone Furnace was installed in 1944, 14 additional units are in operation with still another on order. And at Wisconsin Power and Light Company's Edgewater Station, a Cyclone-Fired Boiler achieved such an outstanding record that B&W Cyclone Furnaces were also specified for that Company's Rock River and Nelson Dewey Stations.

The B&W Cyclone Furnace simplifies the entire process of coal preparation, combustion, ash handling and ash segregaton. Its cost-saving quality contributes to lower fuel costs and re-



Rock River Station of Wisconsin Power and Light Company. Six B&W Cyclone Furnaces fire 2 B&W Boilers to produce 1,050,000 pounds of steam per hour.



New unit for Wisconsin Power and Light's Nelson Dewey Station will use a B&W Cyclone Furnace to fire boiler producing 700,000 pounds of steam per hour.

duced maintenance as well as increased operational simplicity, flexibility and safety. Recognition of these facts is attested by the 77 Cyclone Furnace Boilers now either in service or under construction throughout the country.

Many other modern advances in combustion and high-pressure, high-temperature steam generation are also available through B&W. They merit examination in connection with your next installation. Write for further information to The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

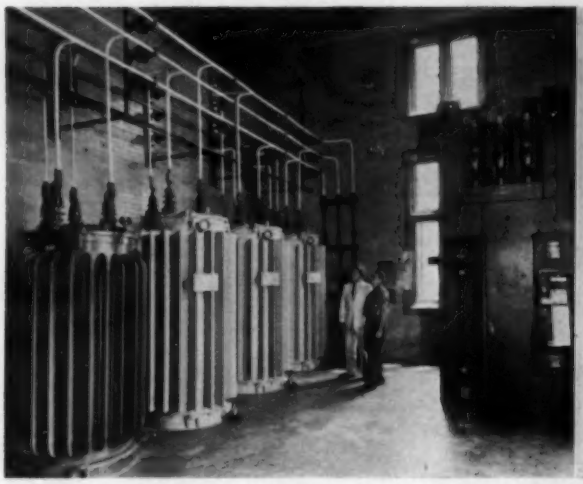
PURCHASERS OF THE B&W CYCLONE FURNACE

FOR CENTRAL POWER STATIONS	Number of Cyclone Furnace Boilers
Atlantic City Electric Co.	1
Baltimore Gas & Electric Co.	1
Chilena de Electricidad	2
Columbus & Southern Ohio Electric Co.	2
Commonwealth Edison Co.	16
Consumers Public Power District (Nebraska)	1
Detroit Edison Co.	1
Indiana & Michigan Electric Co.	1
Jersey Central Power & Light Co.	3
Memphis Light, Gas & Water Division	3
Middle South Utilities, Inc.	1
Missouri Public Service Company	2
Monongahela Power Co.	1
Northern Indiana Public Service Co.	3
Ohio Edison Co.	2
Ohio Power Co.	6
Public Service Co., of New Hampshire	1
Tampa Electric Co.	3
United Illuminating Co.	2
Wisconsin Power & Light Co.	4
FOR INDUSTRIAL INSTALLATIONS	
American Cyanamid Co.	1
American Enka Corp.	1
Clinton Corn Processing Co., Division of Standard Brands	1
Columbia Southern Chemical Co.	1
Consolidated Water Power & Paper Co.	1
Dow Chemical Co.	5
Eastman Kodak Co.	1
Greenwood Mills	1
International Paper Co.	4
National Container Corp., of Wisconsin	1
Rhinelander Paper Co.	1
St. Croix Paper Co.	1
Thilmany Pulp & Paper Co.	1
West Virginia Pulp & Paper Co.	1
Total	77

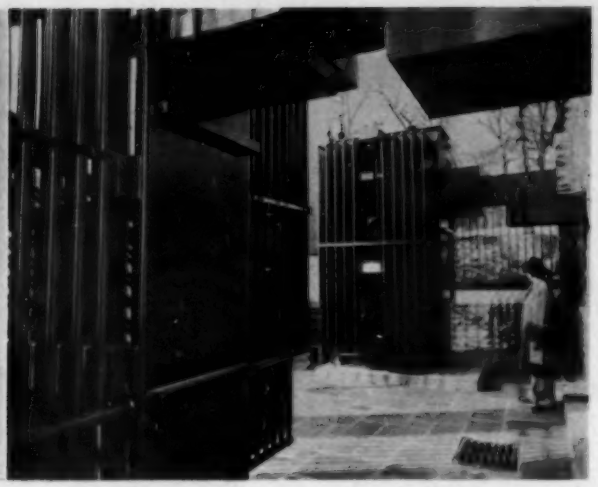
BABCOCK & WILCOX

BOILER DIVISION

G-887



BEFORE — Single phase transformers with exposed 13,000 volt bus.



AFTER — New 3,750 kva, 13,200-2400/1360 grounded wye installation.

Pumping Station Improved – Baltimore

ELECTRICAL EQUIPMENT MODERNIZED

RECENT modernization of the Ashburton Pumping Station, (Baltimore, Maryland) included not only new pumps, but because of the increased hp required, it became necessary to install new transformer capacity and new incoming 13,200 volt metal clad switchgear. Also looking to the future, new switchgear type reduced voltage motor starters were installed, not only for the two new 1500 hp units, but also for two future 1500 hp units.

Engineered and designed by Whitman Requardt & Associates to utilize the existing physical arrangement of the station, and to minimize noise disturbance to the neighborhood, the specifications called for synchronous machines totally enclosed with built-in air to water heat exchangers and oil lubricated sleeve pedestal type bearings.

This first phase included the replacement of the two 600 hp 28 mgd units and the new motor control has been designed so that it can be used with the existing 900 hp units and in the future to be adequate for two proposed 1500 hp units, estimated for installation in 1980.

The photographs of the old transformers and motor controls indicate a sharp contrast to the modern equipment. Safety to personnel has been greatly increased.

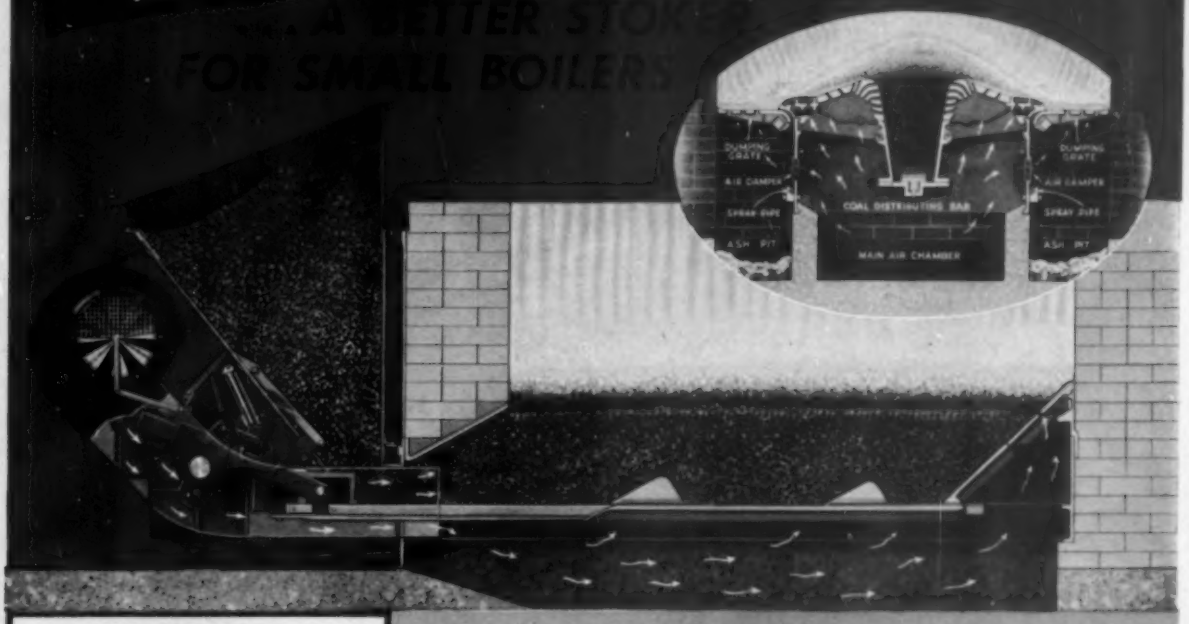
BEFORE — 2300-volt motor starters, using open wiring for power circuits.

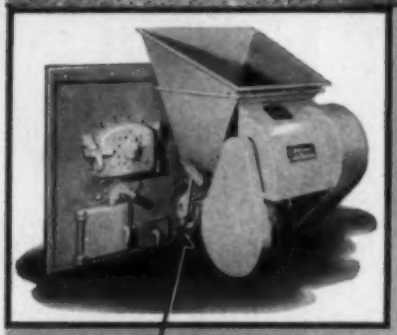
AFTER — 2300-volt, metal-clad, switch-gear type starters for water pumps.

BURN COAL
the Modern Way
for Economy

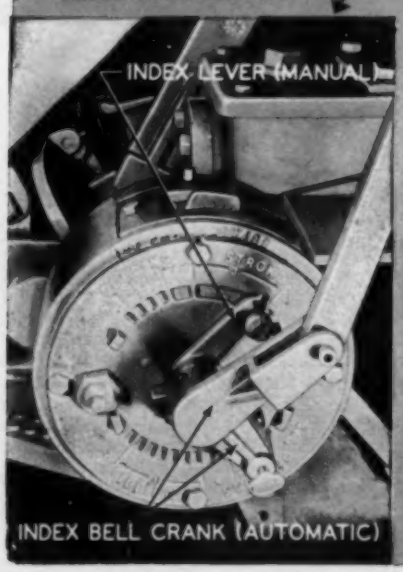
DETROIT LoSTOKER

A BETTER STOKER
FOR SMALL BOILERS





DETROIT ADJUSTABLE FEED



Many Sizes—3,000 to 12,000 pounds steam per hour. Readily applied to new or old boilers. Save coal—eliminate smoke.

The Detroit LoStoker is a plunger type underfeed, mechanically driven, side cleaning stoker sturdily built for long trouble-free service.

LOSTOKER FEATURES INCLUDE:

PLUNGER FEED—Long experience has proved this to be the most dependable type of coal feed.

HEAVY DUTY, MECHANICAL DRIVE—Machine cut worms and gears, mounted in roller bearings, run in oil. Motor or steam turbine operated, requires little power.

HIGH TUYERES—Supply more air toward center of retort, reducing coking tendency, increasing burning rate and improving efficiency.

INTEGRAL FAN—Fan and stoker driven by a single motor or turbine. LoStokers are easy to install.

CONTROL—Thirty-two different coal feeding rates. Optional are "Start and Stop" or "Fully Automatic," with the "Adjustable Coal Feed Control." Air supply in either case is proportioned to coal feed.

BRICKSET or FIREBOX APPLICATIONS

LoStokers may be applied in brick setting to all types of water tube, tubular and firebox boilers. Where Furnace volume permits, a LoStoker may be installed directly in the firebox, without front and sidewall brickwork. LoStokers are only one of several types of our underfeed and overfeed spreader stokers.

Write for recommendations. No obligation.

DETROIT STOKER COMPANY

MAIN OFFICE AND WORKS • MONROE, MICHIGAN

District Offices or Representatives in Principal Cities

Looking for cost leaks? Look at your steam traps

Engineering approach to steam trapping can save thousands a year on costs of fuel, trap maintenance, process cycle time, and uniformity of product quality

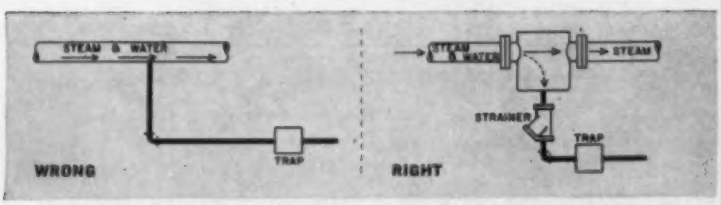
Plant and process engineers all across industry have found that Sarco *Production-Planned* steam trapping can pare operating costs by thousands of dollars a year.

Production-Planned steam trapping is an engineering approach to the problem of getting full design values of heat transfer from steam using equipment. Scores of case histories show that it can make substantial savings and improve processing efficiency. At the same time, costly trap maintenance can be greatly reduced.

In Sarco *Production-Planned* steam trapping, traps are matched to the job by *type* as well as size. They are properly placed, correctly installed. And, to keep down maintenance and replacement costs, every trap is top-quality.

It may pay you well to take this engineer's-eye view of *your* steam trapping. And why not have a Sarco representative look over your system with you? His suggestions will be completely objective because Sarco—and only Sarco—makes a steam trap for every basic requirement. Quality? Recognized everywhere for half a century.

Production-planned systems make best use of traps



As the two illustrations above show, correct application of steam traps is as necessary as using the right trap. In the hook-up on the left, the lack of a condensate collection point plus the long leg to the trap will result in condensate's flowing past the drain point, possibly causing water hammer. The correct way to install the trap is shown at right, placed close to the drain point. A *strainer* should be placed before *any* trap to prevent entrance of scale or other foreign matter into the trap.

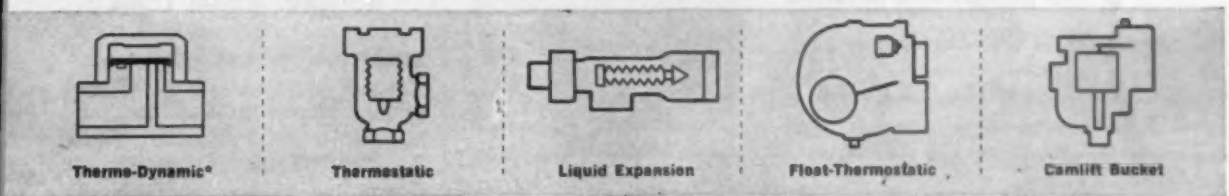
This is just one example of the way your Sarco representative can help you plan your steam system for maximum production.

Traps must be matched to job for best system performance

No single type of steam trap will perform well in all applications. Each type has a range of applications for which it is best suited. For optimum efficiency these differences must be taken into account; traps must be chosen for their operating principles as well as their size and pressure rating.

Sarco can give you impartial help in selecting traps because only Sarco makes the five basic types. With Sarco, it's simple—one source, one responsibility, for all your trapping needs.

Only Sarco makes these five basic types of steam traps



5579

Take these two steps to Production-Planned steam trapping:

(1) Write today for Sarco literature; (2) Talk with your Sarco representative. He can help you check your trapping requirements, and he has—or will quickly get—the right answer to any unusual trapping problem.

*T.M.U. Pat. No. 2,817,353.

SARCO

COMPANY, INC.

635 Madison Ave., New York 22, N. Y.

STEAM TRAPPING • AIR VENTING • TEMPERATURE CONTROLS • HEATING SPECIALTIES

Better Compressor Drive

FORMERLY, our Gardner Denver plant air compressor (7" x 11") was operating on an arrangement whereby the 25 hp driving motor was started or stopped according to predetermined pressure limits. The magnetic controller of the motor was activated by a pressure switch located on the receiving tank.

Power consumption studies were conducted which indicated that the 25 hp capacity was only required during start-up at the lower pre-set pressure level. Further studies showed that the maximum power required by the compressor, while operating between the limits of our pressure levels, amounted to 15.2 hp.

Operating the compressor in this manner had the following disadvantages:

1. Increased electrical power costs due to frequent starting and stopping and the high power consumption while starting.
2. Increased downtime resulting from frequent replacement of magnetic controller contacts. Also, increased cost of replacement of these contacts.
3. Cost of, and downtime resulting from frequent replacement of the eleven V belts driving the compressor.
4. Increased wear of both V belt sheaves.

In view of the above disadvantage, it was decided to alter our air compressor operation in the following manner:

1. Replace the eleven standard B section V Belts with four Dayton Super Thorobred B Section Belts. These four belts have sufficient power transmission characteristics for the normal (non-start and stop) operation of our compressor.
2. Replace the pressure switch with a pneumatic valve "unloader" which allows the motor to continue operating, but no compressing load is applied.
3. Replace the 25 hp driving motor with a 15 hp since it is not economically feasible to operate a motor 40% under load.
4. Install a Twin - Disc Hydo Sheave fluid coupling on the motor shaft to give a smooth start up during the once-per-week starting of the compressor.

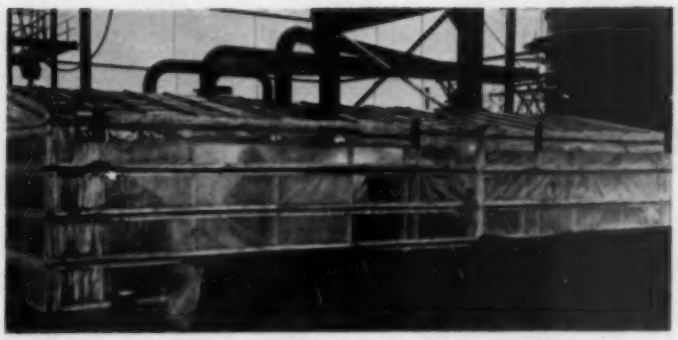
By M. H. DORSEY, Plant Engineer, Hazelhurst Mills, Hazelhurst, Ga.

Rugged Signal Light

SINCE they're the most vulnerable part on the back end of our dump trucks, the turn signals were constantly being smashed; so we eliminated this by placing them inside a 6-inch length of steel pipe, then welding the pipe to the frame.

Now when a truck bogs down in sand or mud, we can push a bulldozer right up against the pipe and push the truck out, without hurting the turn signal.

By H. J. Miller (Fla.)



Polyethylene Maintenance Shelters

TO PROTECT machinery being assembled in the open from corrosive sea air at its ultramodern refinery near Wilmington, Delaware, Tidewater Oil Company constructed an inexpensive type of all-weather shelter with film made of Bakelite polyethylene. Tacked to knockdown wood frames, the tough film withstands rain, snow and winter winds and is inert to most chemicals. The film is exceedingly light in weight and simple to install. Because the film is translucent, construction workers can assemble machinery in natural light.

The flexible film, supplied by Visking Company, Terre Haute, Ind., was tacked to the light wooden framework from rolls 20 ft wide and about 200 ft long. This film is highly resistant to tearing and it remains durable and flexible even at subfreezing temperatures. Inside the temporary structure, air is kept warm and dry with infra-red lamps. This not only makes it more comfortable for the workers assembling the machine, but also helps to prevent condensation of moisture which could cause corrosion of machine parts.

Traps in Severe Service

FOR OVER fifty years it was well known that high pressure steam curing would produce a superior cinder and concrete block. This process was uncommon, however, until developments in recent years made large scale production possible. The resulting product is stronger and minimizes cracks from shrinkage after installation.

In 1953 a District of Columbia plant got in on the ground floor by developing a special mix to take advantage of the new high pressure steam curing methods and by installing six autoclaves measuring 113 feet long by 8 ft inside diameter which were the largest ever constructed for the purpose at that time.

Steam is supplied to each autoclave through 2-inch pipes perforated to permit injection with maximum turbulence. Pressure is built up to 140 psi and the temperature rises to 360 F within two or three hours after the autoclave chamber is sealed. Temperature and pressure are maintained for about four hours.

Under conditions such as these, steam traps face the toughest survival ordeal encountered anywhere. High-pressure condensate is heavily contaminated with scale-forming mineral in solution and with highly corrosive elements, sulphur being one of them. Strainers are cleaned once a day; the economizer is scaled down every six months.

In addition, there is reason to believe that the process liberates traces of ammonia gas, known as an accelerant of corrosion. Under these corrosion-erosion conditions it seemed impossible to find a steam trap that could withstand the punishment and continue to function. Several traps failed to perform satisfactorily under actual test.

A 1" Sarco TD-50 Thermo-Dynamic steam trap was installed on the discharge of each autoclave, preceded by a Sarco strainer, and discharging into an open trench. As recommended, the autoclave pitches downward several inches in its 120 ft length. Condensate outlet is located on the floor and covered by a flat plate to hold back large fragments of cinder block.

Despite continued erosive-corrosive conditions, the steam traps have continued to perform without a single failure. Strainers are cleaned after every cycle; but the steam traps have required no maintenance. Functionally the traps have delivered perfect performance.

Condensate Handled by Ejectors

AIR CONDITIONING contractors in the South and Southwest are saving time and money, both for themselves and their customers by using Penberthy Ejectors to pump condensate from air conditioner drip pans to sewer or floor drains that are not conveniently accessible to the unit.

The ejectors are installed in the cooling water discharge line coming from the condenser, the cooling water thus acting as the source of power that pumps the condensate to the nearest drain or returns it to the cooling tower. This eliminates costly trenching and the need for mechanical automatically operated pumps to perform the operation.

The ejector functions continuously as long as cooling water flows through the condenser and since it has no moving parts, bearings, stuffing boxes, controls or electrical connections, long trouble free operation can be expected.

On an installation at the warehouse of a large nationally known grocery chain, ejectors were installed on each of seven air conditioners being served by one cooling tower installation. After three years of operation no service of any kind has been required.

NEW Catalogs & Bulletins

STEAM TURBINES . . . FURNACES BOILERS, STOKERS, BURNERS

2—Water Tube Boilers — Shop-assembled "package" gas-oil or combination fired units described in 8 page brochure. Pressures to 600 psig; 1,000 to 20,000 lb/hr—design features, installations. — VULCAN STEEL TANK CORP.

9—Free Coal Counseling — General information on how Coal Bureau engineers will advise on selection, transportation and utilization of the right coal for your purpose.—NORFOLK AND WESTERN RAILWAY.

11—Feedwater Treatment—Bulletin describes liquid and dry (Braxon & Flako) boiler feedwater treatment recommended for removal and prevention of scaling and corrosion during use of many types of water and for prevention of foaming and carryover. — ANDERSON CHEMICAL CO.

19—Feed Water Deoxygenation — 12 page Bulletin BW-7 describes advantages of chemical deoxygenation of boiler feed water with an aqueous solution of Hydrazine. Covers in detail the properties and action of Hydrazine in maintaining boilers as well as recommended methods of application. — FAIRMOUNT CHEMICAL CO., INC.

30—Guide Specifications — 64 page brochure, including 5 drawings, is a comprehensive guide for preparing specifications on coal-fired low-pressure heating plants in the size range of 750,000 to 5,500,000 Btu/hr. All aspects affected by choice of fuels from storage bin to stack design covered fully. — BITUMINOUS COAL INSTITUTE.

44— Fan Stacks — I-D fan, breeching and stack integrated in a single unit described in Bulletin 1-PCD-1. Straight through breeching assures high, predeterminable efficiency. Structural steel requirements reduced and installation simplified.—PRAT-DANIEL CORPORATION.

96—Packaged Gas Burner — Non-premixing ring gas burner incorporates flame retention regardless of air velocity. Factory assembled forced draft Series H packaged units for gas, rotary oil or combination described in Series B13 literature.—THE WEBSTER ENGINEERING COMPANY.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

102—Teflon Gear Pump — Bulletin describes self-priming rotary gear pump suitable for non-lubricating and corrosive fluids. Suitable for speeds to 1750 rpm at capacities to 10 gpm & pressures to 100 psi. — ECO ENGINEERING CO.

107—Proportioning Pumps—4 p brochure illustrates and describes company's proportioning pumps and package chemical feeding units. Includes applications and specifications. — BIRD ARCHER CO.

108—Active Air—Catalog 2046 shows how to put active air to work in buildings and shops. Direct drive exhaust fans, air circulators, and ceiling fans. — EMERSON-ELECTRIC.

128—How to Solve Pumping Problems — Booklet, 36 pages — Explains the functions and characteristics of Rotary gear pumps; sample application problems with charts and curves on pipe friction losses; viscosity conversion tables, materials of construction for various liquids, and additional information pertaining to pump applicatons.—GEO. D. ROPER CORPORATION.

165 — After Cooler — Bulletin 130 shows how the Aero unit removes moisture from compressed air or gases; "cools water for jackets and intercoolers; cools air or gases in both power and process systems; and protects air tools and pneumatic systems from water damage.—NIAGARA BLOWER COMPANY.

INSTRUMENTS—METERS CONTROLS—REGULATORS

204—Floatless Level Control — Data sheets PC-37 describe control that is unaffected by surface agitation and equipment vibration. Simple, compact, one adjustment unit.—LESLIE CO.

205—Draft Gages — Bulletins describe inclined, vertical tube, air filter gages, straight line and dial pointer type, minified draft and receiver type gages, velocity gages and pitot tubes, gas analyzers and steam calorimeters. — ELLISON DRAFT GAGE CO.

212—Automatic Temperature Control —Data sheets describe versatile automatic indicating temperature control offering many sequence combinations—step-heating, heating and cooling, wide limit control, or temperature control plus operation of signal devices.—SARCO COMPANY, INC.

222—Pressure Regulators — Catalog No. 77 illustrates and describes application, operation and specifications for a complete line of reducing, back-pressure and pump-pressure regulators.—MASON-NEILAN.

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252—Water Columns, Gages, Equipment — Brochure AO — Introduction to low pressure (0 to 250 psi) division of catalog data. Explains principles and construction of Reliance low pressure alarm water columns, and lists accessory equipment. — RELIANCE GAUGE COLUMN CO.

274—Self-Operated Regulators — Series 655 regulators used on a wide variety of industrial applications to control the pressures of water, steam, oil, gas or other fluids, described in 4 p Bulletin C-655. Also used as air operated shut-off valves, which are actuated by pneumatic switches, soleonoid valves, pilot valves or remote panel loaders. — FISHER GOVERNOR COMPANY.

PLANT EQUIPMENT—WELDING TOOLS—PROCESS SPECIALTIES

304—Backing Rings — Bulletin 56-2 describes rings designed for fast economical fit-up in piping, tubing, fittings and valves. Shows how rings assure uniform complete-penetration welds and ease of handling in both shop and field. Carbon steel, wrought iron, chrome alloys, stainless, aluminum and copper.—ROBVON BACKING RING COMPANY.

319—Portable Band Saw — Bulletin describes the Kalamobile, a portable metal-cutting band saw. Has rubber-tired 12" wheels and telescoping handles. Capacity 6" rounds - 10" flat. — Machine Tool Div., KALAMAZOO TANK AND SILO CO.

326—Beam-Type Guardrail—Manual FB-3456 describes how Flex-Beam Guardrail protects danger spots along roads, highways, bridges, and in industrial plant locations. Installation photos, drawings, reference data, dimensions and physical properties. — ARMCO DRAINAGE & METAL PRODUCTS, INC.

331—Storage Bins — Bulletin illustrates and describes Super-Concrete storage bins for industry. Lists of prominent users and varieties of materials are given. Contains tables of capacities and photographs of typical installations.—NEFF & FRY.

387—Industrial Track—How you can save with relaying rails outlined in Catalogs RT-9. Covers switch material and accessories. — L. B. FOSTER CO.

392—Metal Cutters — Catalogs 718M & 755 describe three heavy duty units for cutting almost anything in metal up to ¾" — rods, wire, chain, etc. — H. K. PORTER, INC.

PIPING, VALVES, FITTINGS STEAM SPECIALTIES, TRAPS

407—Piping Materials—Bulletin reports on intensive investigation into problem of main steam piping

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467	484	501	502	505	506	507	509	511	513
519	520	523	527	531	543	545	552	564	566
570	590	598	629	648	691	700	701	705	715
716	738	745	804	842	855	879	906	909	

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materials and gives data on stress rupture characteristics of Types 316 and 347 stainless steel piping adjacent to welded joints. — PITTSBURGH PIPING AND EQUIPMENT COMPANY.

422—Motor Pump—Liquid handling applications described in general bulletin. Sizes from ¼ to 75 hp, 5 to 2800 gpm with heads to 650 ft. — INGERSOLL-RAND.

425 — Steam Trap with only three parts — cap, disc and body described in Bulletin 257. No valve closing mechanisms. Only moving part is solid stainless steel disc. Same trap for all loads and pressure 10-600 psi. — SARCO COMPANY, INC.

426—Pressure Regulating Valves — Standard line of regulating valves for steam, water and air service described in Cat. 77. Complete specification data. — MASON-NEILAN DIV.

442—Sewer Pipe — Folder SF-14056 describes how Smooth-Flo Sewer pipe provides top flow capacity and strength of corrugated metal. Flexible design, strong joints, and centrifugally-spun asphalt lining. — ARMCO DRAINAGE & METAL PRODUCTS, INC.

448—Steam Trap Troubles — Booklet for plant engineering personnel "Banish Your Steam Trap Troubles." —YARNALL-WARING COMPANY.

467—Valve Selecting Guide — Revised edition of Circular 555 (A.I.A. File No. 34) gives tables, technical data and general information on selection of valves, boiler mountings and lubricating devices. — THE LUNKENHEIMER CO.

484—Threading Wrought Iron Pipe—A service manual which discusses in detail the proper threading of wrought iron pipe, both from the theoretical and practical standpoints. Illustrated with many helpful views. — A. M. BYERS COMPANY.

ENGINES, DRIVES POWER TRANSMISSION MATERIALS HANDLING

629—Longer V-Belt Life — 12 page Bulletin 20x6234C describes various types of V-belts and tells how to select and match them. Lists seven steps for correct installation and hints for making them last longer.— ALLIS-CHALMERS MFG. CO.

648—Belt Fastening Tools — Bulletins F-110 and F-111 — Describe new Flexco power tool wrenches and power tool boring punches, designed to speed up fastening of wide conveyor belts; and give recommendations on the use of various impact tools connected therewith. — FLEXIBLE STEEL LACING CO.

691—Tug-Bar—Data sheet describes low-cost answer to load-handling in cramped areas. Weighs only 110 lbs; handles loads up to 4,000 lb; motor driven wheels do the work. — WESTERN GEAR CORPORATION.

WATER TREATMENT, HEATING VENTILATING, AIR CONDITIONING REFRIGERATION, DUST & FUME CONTROL

700—Water Conditioners — 4 p brochure describes Anco water conditioners for hot-water and humidifying systems. Stop rust and corrosion; prevent discolored water. — ANDERSON CHEMICAL COMPANY, INC.

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467	484	501	502	505	506	507	509	511	513
519	520	523	527	531	543	545	552	564	566
570	590	598	629	648	691	700	701	705	715
716	738	745	804	842	855	879	906	909	

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701—Exhausting Corrosive Fumes — Bulletin 702-A shows how corrosive fumes can be exhausted with rubber, lead lined or specially coated fans. — CLARAGE FAN CO.

705—Test Your Tower—Bulletin offers simple, proved method by which you can determine how closely your actual tower performance measures up to specified performance. Particularly applicable to operations geared to temperature of process cooling water. — THE MARLEY COMPANY.

715 — Amine Treatment — Return line corrosion is a critical problem in maintaining economical, efficient power plant operation. Bulletin CP-100 shows how amine treatment is an easy, effective and economical way to eliminate pipe corrosion problems. — THE BIRD ARCHER COMPANY.

716—Dust Collection — Whether nuisance elimination or process material recovery, check on Whirlex Dust Collector Units. Engineering

PLANT MAINTENANCE AIDS

501—Neoprene Rubber - Coating — Charcote, a waterproof protective barrier against rust and corrosion described in 4 p bulletin. Offers plant engineer outstanding protection against corrosive fumes, salt spray, abrasion and moisture. — CHARLESTON RUBBER CO.

502—Hazardous Liquid Gasket Material — How type 662 gaskets can stand varying climatic conditions without drying, shrinking, or hardening described in Bulletin AD-146. For use against gasoline, water and oil at temperatures up to 300 F. Has Underwriters' Laboratories, Inc. approval. — THE GARLOCK PACKING COMPANY.

505—Metal Cutters — Bulletin 655 shows actual cost figures on various metal cutting jobs (bolt, rod, wire, chain, etc.), by using cutters, hand and power-operated cutters. — H. K. PORTER INC.

506—Gage Glass Cleaning Tool — Data sheet No. 301 describes tool which uses brushes to quickly and efficiently clean inside of liquid level gage glass. — JERGUSON GAGE & VALVE CO.

507—Power Sweepers — Folder describes the "704," a compact unit for small plant budgets; designed for congested areas and narrow aisles; gasoline, LP gas or battery powered. — WAYNE MANUFACTURING COMPANY.

509—Rust Solvent — Data sheet describes "Liquid Wrench" a penetrating rust solvent that loosens rusted bolts, nuts, screws and "frozen" parts. Safe for all metals and alloys. — RADIATOR SPECIALTY CO.

511—Maintenance Ideas—"Genius at Work" — Contains ideas about plant maintenance, bits of philosophy, new products and a description of the company's line. — KANO LABORATORIES.

513—Conveyor Belt Repairs — Bulletin R-700 and Folder R-4 describe the "Rema" method of making vulcanized repairs without heat. Holes, gouges, rips and tears can be repaired on the job. Curing time delay is eliminated. Belts can be put into service immediately after repair is made.—FLEXIBLE STEEL LACING COMPANY.

519 — Sealing Compound — Data sheet describes Tite Seal for leakproof, pressure-tight connections. Gasket and joint compound heat and vibration proof. Prevents rust and corrosion. — RADIATOR SPECIALTY CO.

520—Lubrication Manual — Selection & application of right lubricant for 560 lubricated plug valve applications featured in 12-p manual. Service and temperature ranges tabulated. — WALWORTH COMPANY.

523—Boiler Gaskets — Catalog describes wire - inserted woven asbestos and spiral wound metal-asbestos — for manholes, handholes and tube caps of all makes of stationary and marine boilers, water walls, economizers, etc. — THE BELMONT PACKING & RUBBER CO.

527—Wear-Free Packings — File No. DMSP describes complete line of metallic and semi-metallic packings. — DURAMETALLIC CORPORATION.

531—Stack Maintenance — How wrought iron offers unique defense against flue gas corrosion described in bulletin "Wrought Iron for Flue Gas Conductors." — A. M. BYERS COMPANY.

543—Belt Clamps — Bulletin FP-1 describes new lightweight durable belt clamps that can be easily operated by only one man. Can be used for installing new belt splices or for shortening belts.—FLEXIBLE STEEL LACING CO.

545—Correct Lubrication — "Lubriplate Data Book" shows importance of providing and maintaining proper and economical maintenance of all types of plant machinery thru adequate lubrication. — FISKE BROTHERS REFINING CO.

552—Packing Removal Tool — Bulletin DHSP describes the Dura Hook that "works around corners" for removing old packing from stuffing boxes.—DURAMETALLIC CORPORATION.

564 — Anti-Corrosive Paints — Bulletin, "The Application of Subox and Subalox Paints" — Gives the story of a complete paint system for weather, moisture and alkali protection, with details as to application.—SUBOX, INC.

566—Tube Expanding — Bulletin 55 on torque control describes automatic air driven tube expander drive. Control assures uniformity of tube expanding. — THOMAS C. WILSON, INC.

570—Multi-Purpose Grease — Bulletins describe new single product Gulfcrown grease (4 consistencies) that does the work of many—simplifies application and avoids errors, reduces inventory and cuts lubrication costs; grease gun or centralized system application. — GULF OIL CORPORATION.

590—Steam Line Treatment—Folder describes alkaline IPCO-S-L-T. Used in boiler water it will volatilize and travel with steam to return lines. Prevents costly repairs and provides insurance against replacing pipe and fittings.—INDUSTRIAL PRODUCTS CO.

598—Valve-in-Line Reseaters — Bulletins describe power-driven, one-man operated reseaters (pneumatically or electrically powered) for modern gate and globe valves. Reduces grinding time to minutes. Saves money on valve inventory and maintenance. — THE LEAVITT MACHINE COMPANY.

599—Fact Folders — Reference folders offer up-to-date data on industrial metals, insulation, roofing and siding, glass fiber panels, polyethylene and other industrial supplies immediately available for fast, accurate delivery.—REYNOLDS ALUMINUM SUPPLY CO.

data available. — THE FLY ASH ARRESTOR CORP.

738—Deaeration—Why? How?—Bulletin 4650 explains in capsule form fundamentals of deaeration and why it is so necessary in water conditioning. Principles, advantages, and application of various methods discussed. — COCHRANE CORPORATION.

745—Dust & Fume Control — 40 p booklet gives helpful information on recovering dusts, fly ash, mists, fumes and other suspensions of gases. Summarizes important points design and plant engineers should know about electrical precipitators.—WESTERN PRECIPITATION CORPORATION.

ELECTRICAL

804 — Electronic Ground Alert — Portable & stationary units detect line-to-ground faults immediately. Available for 220, 440, 2,300 & 4,160 volt underground systems. Form 255 gives details. — DELTA ENGINEERING SALES CO.

842 — Circuit Protection — Bulletin FIS describes the maintenance free Fusetron fuses which protect motors, solenoids, coils and transformers against burnout, and which increase production by eliminating needless blows.—BUSSMANN MFG. CO.

855—Wiring Analyzer — 4 page bulletin describes Model 301 Adequate Wiring Analyzer which quickly, simply and easily tests wiring without confusing calculators or slide rules.—SPRAGUE ELECTRIC COMPANY.

879—Commutator Maintenance — 27 page booklet B-6150-A contains information on brush and commutator maintenance. Includes maintenance requirements, factors affecting commutation and carbon brush materials. — WESTINGHOUSE ELECTRIC CORP.

OPERATING AIDS SUPPLIES & MISCL.

906—Steel Measuring Tapes — Complete catalog describes full line of measuring tapes from 6 to 100 ft, including wide blade tape with upright measurements. — EVANS RULE CO.

909—Industrial Skin Cleanser—Folder describes Vi-Van Clean, a non-alkaline, non-acid, all-purpose antiseptic skin cleanser that prevents dermatitis and other skin conditions. Self-service dispensing units. — DAMERON ENTERPRISES, INC.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 83

Piping Layouts

A COLLECTION of 25 basic piping diagrams with complete recommendations for valve selection and location in the lines has been prepared by registered consulting engineers in collaboration with Jenkins Bros. engineering staff and leading equipment manufacturers.

Layouts include package boiler connections, automatic combustion controls, water softening systems, industrial plant air compressor, industrial waste treatment system, sulfate pulping process system, etc.

Data supplements two other booklets released by Jenkins in past years as a service to consulting engineers, architects, plant operating personnel and other specification writers.

For your complimentary copy ask for Volume 3 on your company letterhead to Jenkins Bros., Room 22, 100 Park Avenue, New York 17, New York.

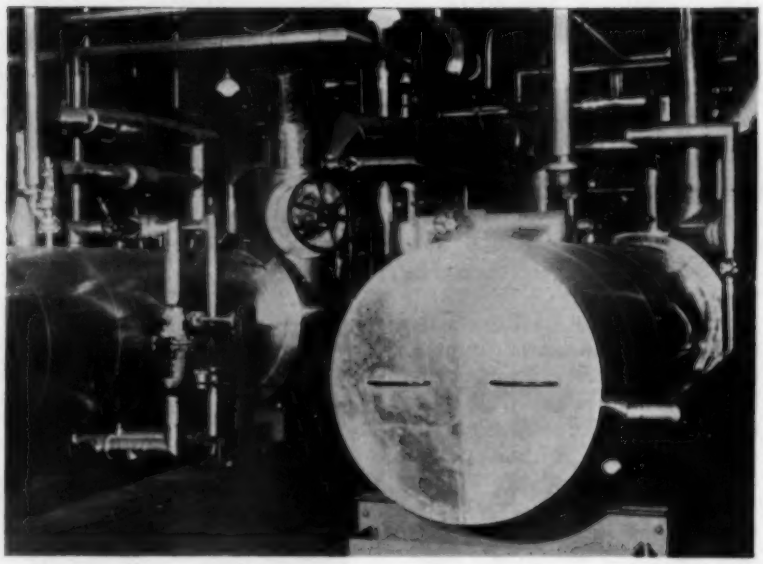
Spotless Grease Job

WHAT do you do when the heat's too great for grease to stay put? When it drips, forms sludge, and befouls both your production and your product?

Porcelain Metals Corporation, of Louisville, Ky., had this problem with a conveyor. The conveyor carried porcelain-enamelled parts through a 450 F oven. Greases used on conveyor bearings thinned out at these temperatures . . . dripped on the newly enamelled parts before they baked dry. Result: rejects. Also, sludge formed in the bearings, slowing the conveyor and raising its power needs.

Porcelain Metals solved the problem with Dow Corning 44 Grease, a heat resistant silicone lubricant. 44 Grease doesn't drip or sludge at high temperatures. Since switching to this silicone lubricant, rejects have been eliminated, the conveyor runs smoothly, and labor costs for maintenance have been greatly reduced.

Product Briefs



All-Metal "Thermos" Reflective Insulation

E-1 **Mirror Insulation Co. Inc.,** 201 Main St., Lambertville, N. J., offers an all metal prefabricated thermal insulation for industrial applications to meet various service temperature requirements, barring heat flow. This reflective insulation is prefabricated into many finished insulating units which may be readily removed and put back intact, such as pipe covering, pipe fitting covers, flange covers, and valve covers. Insulation will handle temperature in range of minus 400 F to plus 2,000 F.

Mirror insulation is fireproof, inherently waterproof and weatherproof, non-absorbent, impervious to thermal shock, dimensionally stable, stands vibration, saves weight, minimizes maintenance, and is proof against most industrial atmospheres.

The new insulation is made up of air spaces, partitioned by reflective metal sheets. It is very light in weight, facilitating handling and installation.

Standard forms are usually secured to insulated surfaces by stainless steel bands, or, in the case of large equipment, by sheet metal screws. For fast access, the product is available in a "Quick-Removable Type" employing a snap-latch feature.

For More Free Data CIRCLE CODE NO. on the Handy Return Card — Page 83

Wire Identification Markers

E-2 Of special interest to electricians, wire maintenance men, contractors, plant electricians, is a new pocket size carton holding twenty-five cards of different Perma-Code Vinyl-Cloth Wire Markers, manufactured by **W. H. Brady Co.,** 727 W. Glendale Ave., Milwaukee 9, Wis. The "Maintenance Pac" provides a ready, convenient supply of markers for original installations, rewiring, or maintenance work. It fits into tool kits, is easily handled and eliminates waste and "mix-ups."

Markers are mounted on the firm's Blue Streak dispenser cards and assembled in the following most-used combinations: 1 through 25; 26 through 50; 51 through 75; 76 through 100, and up to 176 through 200 plus solid letter cards A through Z. Each Wire Marker Maintenance Pac contains a total of 900 separate 1½" long markers (for identifying wires ¼" OD and larger). Markers can be obtained with ¾" scorings for marking wires under ¼" OD (1,800 markers per carton) on request at no extra charge.

Versatile Power Sweepers

E-3 The Wayne Manufacturing Company, 1275 East Lexington St., Pomona, Calif. has released two new power sweeper models — 705 and 706. These new models are designed to sweep both indoors and out.

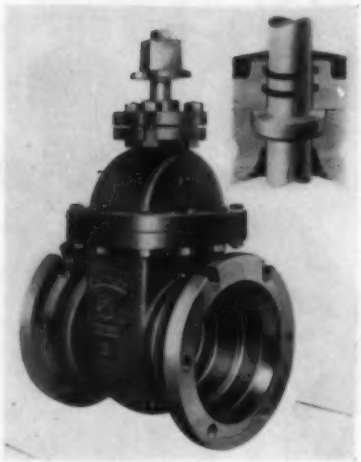
Outstanding feature of these two new models is the patented Filter-Vac Dust Control System which completely eliminates the emptying of a dust bag when cleaning the filter system. Dust laden air passes through a series of filter sleeves and deposits dust directly into the hopper. Dumping the hopper is a simple operation accomplished by merely hydraulically raising the rear hopper.

The models incorporate such engineering advances as to the providing of the largest effective dirt hopper capacity of any power sweeper, automotive type steering, full all-round vision, heavy steel wrap-around bumpers and a new quick broom change assembly. All operations are shielded for extra safety.

The sweepers will pick up waste matter ranging in size from fine dust to large beverage bottles. Revolving side brooms extend beyond the body to sweep flush with walls and equipment.

In addition, a flexible hose attachment for cleaning bins and shelves makes these models both a vacuum cleaner and a power sweeper. The main sweeping swath of the Model 705 is 36 in. and the Model 706 has a main sweeping swath of 48 in. The Model 706 can sweep in excess of 125,000 sq ft an hour in open areas.

New Product Briefs (Continued)



Gate Valve

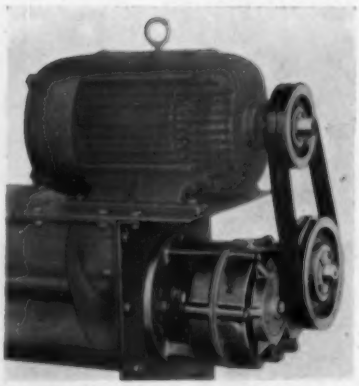
E-4 Continually finding wider acceptance and use is A. W. W. A. Standard Iron-Body Double-Disc Gate Valve with O-Ring construction and mechanical joint ends by **Kennedy Valve Mfg. Co.**, Elmira, New York.

The two O-Ring Seals are Buna N synthetic rubber compound of 70 Durometer hardness. These are assembled into a Kennedy stuffing box which forms the top thrust bearing for the stem collar. The stuffing box is secured to the valve bonnet with rust-proofed steel bolts. The top O-Ring is the dirt seal. The lower O-Ring is the pressure seal eliminating any need of further adjustment. O-Rings provide an excellent seal preventing any binding of the stem and resulting in very easy valve operation.

Optional in these valves, when O-Rings are required, orders must so specify. The suffix "X" is added to the applicable Figure Number to identify valves with O-Ring Seals.

Mechanical joint ends are available in sizes 3" through 14". Kennedy can supply valves with Mechanical Joint Ends through 48" sizes.

These valves have inside screw, non-rising stem and parallel seats. Working pressures are: 12" and smaller, 200 lb cold water; 14" and larger, 150 lb cold water.



Good Protection With Screw Conveyor Drive

E-5 A new screw conveyor drive that is simple to mount and adjust on standard conveyor troughs is announced by the **Dodge Manufacturing Corp.**, Mishawaka, Indiana.

The unit consists of a speed reducer with packing gland and driving shaft, which mounts on the trough end.

Design insures the utmost protection for the speed reducer unit against invasion by the material being handled by the screw conveyor. The packing gland is adjustable from the outside, takes standard packing and may be inspected by sight. Any material that might work through the packing would fall to the floor instead of forcing its way into the reducer.

A flinger seal on the shaft next to the reducer also prevent liquids or other foreign matter from reaching the reducer seals. A third barrier against contamination is provided by double lip reducer seals.

Slotted holes in the flange of the reducer permit the unit to be rotated for quick and easy adjustment of the V-belt drive center distance. Both the motor and the drive may be mounted in any position.

Screw conveyor drives are available in four sizes which cover 90% of the requirements of industry. Each size is offered in two ratios . . . 18 to 1 and 8 to 1.

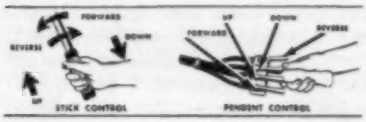
Powered Hoist Trolley

E-6 One man can raise, lower or move loads up to two tons with positive control with a new powered hoist trolley — the "Hoistractor" — announced by **Gardner - Denver Company**, Quincy, Illinois.

Powered by an axial-piston type

air motor, the "Hoistractor" exerts 250 lb drawbar pull on a beam through a spring-loaded neoprene drive wheel. It will pull a two-ton load at 70 fpm. Speed can be varied from a slow creep to full speed of 150 fpm.

A single one-hand control for hoist and tractor is available in two types. Both types control raising and lowering the load by hoist, and moving the load by "Hoistractor." Both leave the operator one hand free to guide the load.



The first type is a pendent control. A squeeze hand grip has up-down operating levers for the hoist and foreaft levers for the "Hoistractor." Depressing a lever operates units, but accidental lever pressure will not start operation because the air line is dead until the operator squeezes the grip. Increasing pressure on the lever increases speed of operation.

The second type control is known as a Stikontrol. It is a swiveled rod with four-way grip control. Raising or lowering the grip raises or lowers the hoist load. Rotating the grip clockwise controls forward motion, while counterclockwise rotation controls backward motion. Universal joint on the rod permits the operator to stand away from the load when operating in order to avoid objects in his path when moving the load.

The new Gardner-Denver "Hoistractor" fits most standard size beams. It is easily adjusted to permit mounting on 4-inch, 7.7 lb to 18-inch, 54.7 lb I-beams. It can also be adapted to operate on other types of track.

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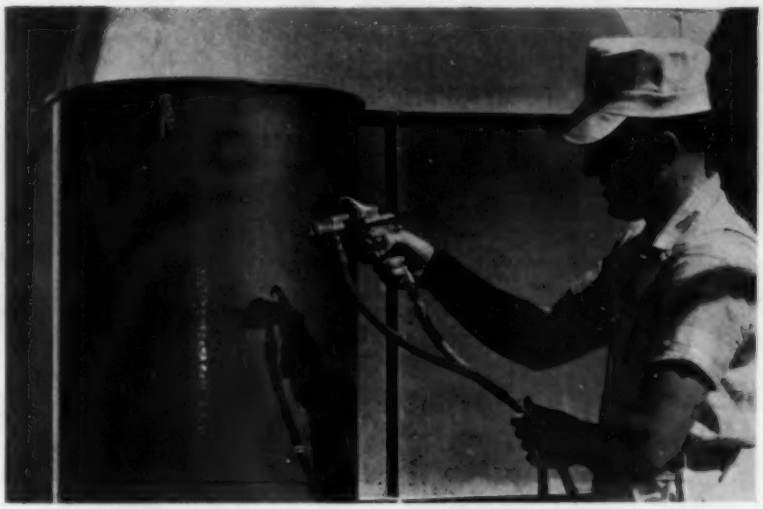
For more information, use Reply Card—Page 83

New Product Briefs (Continued)



Charcote can be brushed on, rolled on, sprayed or used as a dip.

Neoprene Rubber Coating Offers Corrosion Protection

E-7 A corrosion inhibiting, liquid Neoprene protective coating with a "built-in primer has been developed by the coatings division of **Charleston Rubber Company**, Stark Industrial Park, Charleston, South Carolina. It has multiple uses in solving industrial, marine, transportation equipment, and other maintenance problems.

This special new combination primer-coater is known as Charcote CIC-21. It is one of several "Charcote" protective rubber-coatings now manufactured by the company, through its own exclusive formulations using a base of Dupont Neoprene.

Charcote CIC-21, with its "built-in" primer, makes possible substantial savings of material and labor costs normally required in application of primer coats. Other advantages include ease and flexibility of application, excellent long lasting resistance to weathering, chemical fumes, salt spray and corrosion creep; the resistance of its hard, tough, yet flexible film to impact and abrasion.

CIC-21 contains five ingredients selected for their strong corrosion inhibiting nature. One is red lead, long proven corrosion inhibitor.

Charcote CIC-21 special rubber-coating is available only in red and sells for approximately $8.25 per gallon with reductions for larger quantities. The standard "Charcote" protective rubber-coatings now made by Charleston Rubber Company are available in red, aluminum, black, green and grey. All adhere splendidly and durably to metals, concrete, wood, rubber, canvas and other materials. All can be brushed on, rolled on, sprayed or used as a dip.

Hose & Cable Reels

E-8 A new addition to the Weldreel line of welding hose and cable reels has been introduced by **United Specialties, Inc.**, El Dorado, Ark. The new model is designed to hold 50 feet of half inch I. D. hose and may be used for handling air, gases or liquids.

Like its companion dual hose reel which carries both the UL and Factory Mutual labels, the new single hose reel, Model A-2, has a spring powered automatic retracting mechanism and automatic pawl locking device. These permit the hose to be drawn out easily to the required length and locked, yet has a firm pull for retracting onto the enclosed reel drum.

Weldreel units may be mounted on walls, floors or ceilings or installed on mobile equipment. Special designs are developed to meet individual needs or uses.

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Graphite Silicone Paint

E-9 A new paint, made of graphite and silicones and capable of withstanding violent thermal shock of a 1,000 F range, has been introduced by the **Joseph Dixon Crucible Co.**, Jersey City, N. J.

The new paint, called "Thermocone," has particular maintenance application in the steel and process industries.

The efficiency of the new paint has been demonstrated under extraordinary test conditions by heating metal discs, painted with "Thermocone" to a temperature of 1,000 F, and plunging them into beakers of icy water. The shock does not cause the paint to crack, peel, flake or bubble.

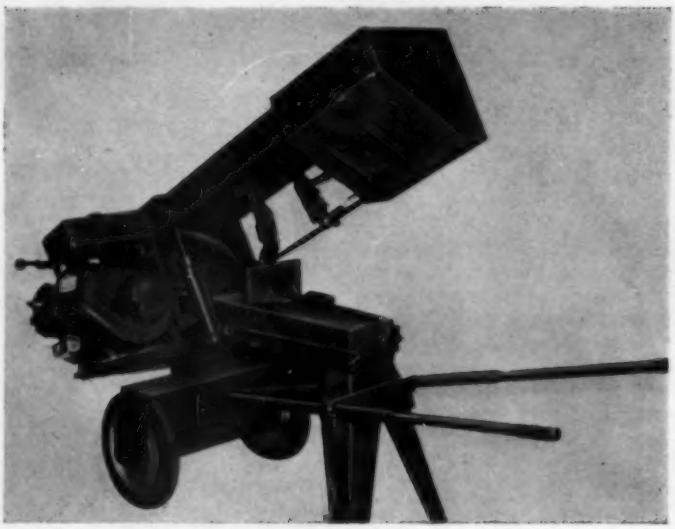
Thermocone is manufactured in two colors, black and aluminum.

Power Pipe Machines

E-10 A new, lightweight Power Drive for hand pipe tools has been introduced by **The Oster Mfg. Co.**, E. 289th St. & Nickel Plate RR, Wickliffe, Ohio. One of the biggest features of the Oster "100" as the new machine is called, is its low cost. (Lower in price than all other comparable 2" machines in its class.)

Its compact, lightweight design (only 77 lb) makes it ideally suited for quick maintenance threading anywhere in the shop. In addition to the hinged folding stand, the "100" can be bolted directly to work bench or clamped on a truck, bench or other suitable mounting by means of a special "C" clamp attachment.

New Product Briefs (Continued)



Metal-Cutting Band Saw Moves Right to the Job

E-11 The illustrated gasoline engine powered Kalamobile is a completely portable horizontal metal cutting band saw manufactured by the Machine Tool Div. of the **Kalamazoo Tank & Silo Company,** 657 Harrison St., Kalamazoo, Mich.

Combining self power and complete mobility, the Model 610D Metal Cutting Band Saw can now be used in all types of field work as the gasoline engine powered Kalamobile or MG610D.

The MG610D is fast, accurate and a labor saver. It is used for all types of intermittent cut-off work such as pipe, cable, channel, conduit, and angles. The unit is powered by a reliable Continental Red Seal, 2 hp gasoline engine.

The chassis, with its "wheelbarrow" principle, is rolled about on 12" solid rubber tired wheels. Collapsible handles are telescoped into the handle tubes, eliminating objectionable interference when the jectionable interference.

Liquid Ring Pump for Transfer Service

E-12 A new self-priming liquid ring pump for transfer applications has been introduced by **Goulds Pumps, Inc.,** 39 Black Brook Rd., Seneca Falls, New York.

Lightweight, quick and positive self-priming action and the ability to handle air alone, liquid alone, or a combination of air and liquid provides maximum utility for Goulds Fig. 2520 pump. Pump is available with motor for permanent installations or mounted on heavy duty casters for portable utility use. It is also available for use with V-belt drive.

Centripetal action of the pump directs liquid toward the center to provide the rapid positive priming necessary for transfer or similar applications. Minimum wear is assured by no rubbing parts. Easy access to the interior of the pump is possible through casing cover without disturbing pipe connections. Suction and discharge are 1½".

Impeller and shaft are the only moving parts. Impeller is of the straight blade or paddle type, keyed to the shaft. Fig. 2520 liquid ring pump is available in cast iron or AISI 316 stainless steel. Pump weight is 42 lb. Suction and discharge connections in the casing are threaded.

High-Capacity By-Pass Valve

E-13 **Watts Regulator Company,** Lawrence, Massachusetts, has announced a new, moderately priced, all-bronze, high-capacity, automatic by-pass valve for regulating liquid pressure as supplied by pressure pumps.

Valve is set to open at the required pressure; when the system demand is reduced, the excess liquid is by-passed back to the supply. Models are available with fixed setting for relief-to-atmosphere applications.

The valve is available in two sizes, ¾" and 1", for pressures from 10 to 250 psi. Designed for pop action, this valve has a high-capacity characteristic; for example, the ¾" size, set at 100 psi, will by-pass 42 gpm.

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Interchangeable Quick Couplings

E-14 A new line of quick connect and disconnect couplings has been introduced by **Perfecting Service Co.,** Charlotte 6, N. C. This new line is interchangeable with other make couplings. Greater flow, less pressure drop, a smaller, more rugged and compact design is emphasized as the advantages of this new "D" Series Interchangeable Coupling. Couplings are now available in various style end connections . . . male, female, hose stem and reusable hose end connections, in size ¼", ⅜", ½" and ¾", with working pressures up to 10,000 psi.

The manufacturer's patented Push-omatic action, featuring one-hand operation, is incorporated in this new design. Coupling locks automatically, without turning or twisting. Locking mechanism makes a positive, leakproof connection, highly resistant to impact or rough handling. Full 360° swivel action reduces pneumatic tool operator fatigue, as well as eliminates troublesome hose kinking.

Interchangeability makes possible replacement of either coupling sockets or plugs, without changing or having separate air lines to existing production equipment.

Complete details are in Bulletin No. 1500.

New Product Briefs (Continued)

Power Tapes

E-15 **Evans Rule Co.,** Elizabeth, N. J. has introduced the latest addition to their line of Power Tapes, the new Power Fifty, a 50 ft model featuring Patented Control Speed Blade Return. The new Power Fifty eliminates the tedious hand-winding associated with conventional tapes, for gentle pressure on the power button smoothly and effortlessly returns the extended blade into the case.

The Power Fifty has a tough vinyl-leatherette case that resists moisture, scuffs and stains. The blade is replaceable, and can be changed by anyone in a matter of seconds, without tools. Each "Power Fifty" comes in a protective plastic bubble that serves as a convenient storage container.

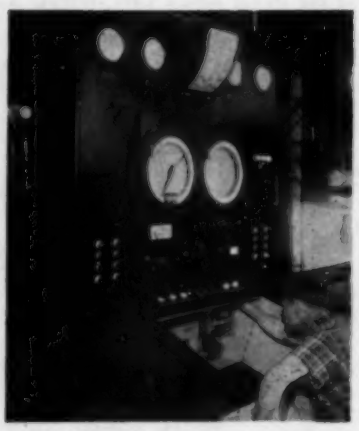
Velocity-Power Driver

E-16 New Model GH-1 Velocity - Power Driver, for driving threaded or headed studs into concrete and steel with energy created by a discharged of blank cartridge, is now being marketed by the **Velocity Power Tool Company,** 201 N. Braddock Ave., Pittsburgh 8, Pa.

Trigger activation, push-type replacement of barrel units, and a shape better fitted to hand contour for easier, faster handling are among the design improvements of the new model "Green Hornet" driver. Retained in the new GH-1 Velocity-Power Driver are inherent features that assure safe and efficient operation.

Easily inserted interchangeable barrels give the tool a dual versatility, permitting the setting of either ¼-inch or ⅜-inch studs with the same driver.

Loading (top) is easy and safe. Just slip preassembled stud and cartridge into the breech. To position for firing (below) simply close breech by giving handle a half-turn, counterclockwise. Tool is ready for placement at fastening point at right angle to work surface.



"Packaged" Electric Combustion Control Systems

E-17 **The Hays Corporation,** Michigan City, Indiana, now offers ten separate and distinct standardized systems of

control for varying boiler requirements.

The "package" consists of a completely piped and wired free-standing panel containing all instrumentation and control necessary for fully automatic operation of single burner gas and/or oil fired boilers. These boilers may be either packaged type or of the field assembled design.

One of several features is the placement of the manual-automatic control stations required for operation of the system. These switches, together with indicating lights and push buttons, are located on a small console, 33" from the floor. Both convenience and safer operations are enhanced by this arrangement.

Electrical components cabinet is placed immediately beneath the console and contains the automatic programming control, the fan starter, relays and terminal strips — all readily accessible from the panel front.

Complete factory piping and wiring requires only that electricity, together with the fuels and steam, be directed through the control panel before reaching the boiler. Control and shutoff valves, pressure switches, etc., are all included within the piping and wiring of the panel proper.

Field of application is from the small 6,000 to 10,000 lb/hr packaged steam generator to the large 60,000 to 100,000 lb/hr boilers, single burner fired.

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Pipe Insulation With Built-In Tie Wires

E-18 Development of No. 101 Pipe Insulation, a new speed-fastening, high-temperature pipe covering has been announced by the **Baldwin-Hill Co.**, 500 Breunig Ave., Trenton, N. J. Built-in tie wires eliminate the need for conventional tie wires so that No. 101 Pipe Insulation can be applied to large diameter lines as rapidly as more costly molded pipe coverings.

Felted from high-temperature, moisture-resistant spun mineral wool, B-H No. 101 Pipe Insulation, will withstand temperatures to 1200 F. Its exterior surface is faced with a metal fabric of 16-ga wires welded in a 2 x 2⅝-in. rectangular mesh and held in place by 16-ga wires tied through the spun wool to an inner facing of 1-in. expanded metal lath. Speed fastening on the pipe is accomplished (see photo) by hooking seven wires which extend from one end of the outer mesh fabric under the opposite stay wire and bending them over and back.

No. 101 Pipe Insulation is especially well suited for covering nested pipes and steam traced lines since it can be manufactured to fit exactly with no waste material. Having a low alkalinity factor it will not corrode pipes in the presence of heat and moisture. It is available in 2-ft sections and 1½- to 4-in. thicknesses for pipe sizes from 4 to 30 in.

Southern News Briefs — Continued from Page 24

Air Reduction — Houston

J. J. Lincoln, Jr., Air Reduction Sales Company vice president-Southern Region, with offices in Houston, Texas, has been appointed president of **Pure Carbonic Company,** New York, a division of Air Reduction Company, Inc. and will be succeeded by **J. H. Keeney.**

Mr. Lincoln succeeds **E. R. Lawrence** who becomes chairman of the Pure Carbonic division. This division is a leading producer of carbon dioxide in solid (Dry-Ice), liquefied, and gaseous forms.

Mr. Keeney moves into the vice presidency, Southern Region, from his position as marketing manager-equipment, Air Reduction Sales Company, New York. He will be located at 3400 Montrose Boulevard, Houston.

L. T. D. Berg, assistant marketing manager-equipment of Air Reduction Sales Company, succeeds Mr. Keeney as marketing manager-equipment.

Trane — Fla.

The Raymond Diehl Company, Tallahassee, Florida, has been appointed an authorized source of **The Trane Co.'s** package air conditioning equipment.

As an authorized Trane dealer, The Raymond Diehl Company will sell and install Trane packaged air conditioning equipment.

Norelco — Atlanta Office

A new Norelco office has been opened in Suite 113, 3120 Maple Drive, N.E., Atlanta 5, Georgia by the Instruments Division, **Philips Electronics, Inc.,** 750 South Fulton Avenue, Mount Vernon, New York.

Charles C. Hulsey is Sales Engineer in charge of the new facilities which will include the complete line of Norelco instruments. The Atlanta office will serve customers in **Florida, Georgia** and **Alabama.**

A-C — D. C. & St. Louis

Allis-Chalmers Manufacturing Co. has made the following appointments:

W. P. Bell, manager of Industries Group sales in the **Washington, D. C.** office. Bell has been manager of national defense sales for the Group in the Washington office for the last year and prior to that a sales representative there since 1946.

R. E. Morris, manager of Industries Group's **St. Louis, Mo.** district following the resignation of J. C. Lovelace. Morris was a sales representative in the Washington office for several years before being named manager of industrial sales there. Prior to that he had been associated with the Charlotte, N. C. district office.

Ellicott Fabricators — Md.

Novelty Steam Boiler Works, Inc. in Baltimore, Md., a subsidiary of Ellicott Machine Corporation, has been renamed **Ellicott Fabricators, Inc.**

The company has specialized in the production of pressure vessels and special metal fabrications for over 50 years and became affiliated with Ellicott in 1953. The change is being made in order that the new corporate name will be more appropriate and descriptive of the character of the expanding scope of operations.

The products of Ellicott Fabricators, Inc., include hot water generators, storage tanks, air and vacuum receivers, heat transfer equipment and metal fabrications for a wide range of industrial applications.

Law Engineering Testing Laboratory — Southeast

Law - Barrow - Agee Laboratories Inc. has announced its new name as **Law Engineering Testing Co.,** signifying progress in engineering testing, soil mechanics, radiography, quality control inspection, physical testing, chemical analysis and consultation. This registered professional engineering firm is located at 136 Forrest Ave., N.E., Atlanta, Ga. and has branches in Albany, Birmingham, Ala., Chattanooga, Tenn., Charlotte, N. C., and Tampa and Jacksonville, Fla.

George H. Nelson is general manager and **Gordon Dalrymple,** director of engineering.

Southern Fabricating Expands Sales Force

The Tube Division of **Southern Fabricating Co., Inc.**, Sheffield, Ala., has added to its sales force.

Howell Mayo of Florence will represent the company in Alabama and parts of Tennessee, and **Nat Walkind** of Miami has been appointed representative in Florida.

Southern Fabricating produces steel tubing in all commercial sizes and gauges, round, square, rectangular and odd shapes, ⅝" to 4" o.d. Hot rolled finish, cold rolled finish, painting and plating grades, and hot-dip galvanized finish are offered.

William E. Daily is sales manager.

Rockwell — Southeast

A new base warehouse which will supply meters and meter parts to Rockwell warehouses throughout the Southeast has been established at **Rockwell Manufacturing Company's** two-year-old plant at **Statesboro, Ga.**

Principal function of the new warehouse will be to expedite shipments to customers of two major Rockwell divisions — the Meter and Valve and the Municipal and Utilities Divisions.

The two divisions manufacture such products as gas, parking, water and petroleum and industrial liquid meters, lubricated plug valves, and gas regulators.

Cyclotherm — Mo.

Cyclotherm Division National-U. S. Radiator Corp., Oswego, New York, has appointed **E. Paul Harder Associates**, St. Louis, Mo., as a new sales distributor.

E. Paul Harder has been employed as a salesman, engineer, and designer in the heating and plumbing business for almost 20 years. More recently he was employed by Herman-Nelson Corp. in St. Louis for several years as a factory representative. He has also represented Fred Schaub Eng. Co., Chicago, Ill. and the Coates Electric Mfr. Co., Seattle, Wash. for nine years as a manufacturers representative.

Mr. Harder started his own firm in 1947 by operating as a manufacturers agent in plumbing and heating, featuring high pressure steam equipment and electrical heating equipment.

Texsteam Purchases Graham Valve Line

Texsteam Corporation, Houston, Texas, a subsidiary of Vapor Heating Corporation, Chicago, has purchased the assets of **Graham-Lemunyon Corporation**, Los Angeles, a California corporation, makers of Graham plug valves.

Mr. C. P. Graham, the inventor of the Graham non-lubricated plug valves is being retained by Texsteam Corporation as a consultant on new valve designs.

The Graham-Lemunyon assets including the inventory of completed valves, fabricated valve parts, manufacturing fixtures, designs and patents are being moved to Texsteam Corporation's recently enlarged plant in Houston.

Texsteam Corporation has been selling the Graham plug valves for the past three years. The valves have been well accepted in this market, which is attributed to a large degree, to the patented non-lubricated design features, resulting in important savings in maintenance to the customers. Texsteam Corporation plans to increase the number of valves in the line, then extend sales efforts to the chemical and other industrial markets.

Black & Decker — Tampa

The Black & Decker Manufacturing Company has opened a new sales and service branch at 3407 S. Dale Mabry Highway, **Tampa, Florida.** The new branch will provide complete repair and service facilities to users of Black & Decker electric tool products in the Tampa-Western Florida area.

Service Manager at the Tampa Branch is **Edward G. Seiders**, who who was formerly a repairman in the Company's Richmond, Virginia Branch. Mr. Seiders will be under the supervision of **Elmer G. Shue**, Southeastern Regional Service Manager.

A. M. Lockett — Dallas

The Dallas, Tex., district sales office of **A. M. Lockett & Co., Ltd.**, sales engineering representatives of The Babcock & Wilcox Company's boiler division, has been moved to 1701 Mercantile Dallas Building, 1807 Commerce Street, Dallas 1. The office was formerly located at 1826 Life of America Building, Dallas 2.

Southern News Briefs (Continued)

M, M & M — South & Southwest

Three new district sales managers have been appointed by **Manning, Maxwell & Moore, Inc.**

Robert L. Logan, formerly in charge of the company's southeast sales district and headquartered in Atlanta, Georgia, has been named manager for the mid-continent district out of **Tulsa, Oklahoma.** Succeeding Mr. Logan in Atlanta is **Lamar F. Kirby,** formerly a company sales engineer.

A-C Industries Group Expands Southern Staff

Establishment of a sales office at 412 First National Bank Building, Abilene, Texas, with **James C. Barnett** as resident representative, has been announced by **Allis-Chalmers Industries Group.** Barnett had been a sales representative in Allis-Chalmers Dallas district office.

John E. Garrett and **Fred H. Young** have been assigned as sales representatives to the Atlanta and Jacksonville offices, respectively.

New Instrument Div. For Schutte and Koerting

Schutte and Koerting Company, Cornwells Heights, Bucks County, Pennsylvania, has announced the formation of a new Instrument Division to manufacture and market the company's well-known line of precision instruments for measuring fluid rate of flow and other related products.

Flori-Houston — Southwest

Robert C. Ayers, Jr., of Houston has been appointed regional sales representative for Flori-Houston, the pipe fabricating divisions of **Sparton Corp.,** comprising the Flori Pipe Company of St. Louis and Houston Pipe and Steel, Inc., of Houston. His territory will comprise the Gulf Coast area, Texas, southern Arkansas and Louisiana, including accounts in Houston.

Ayres has had approximately 12 years sales experience with mechanical and industrial firms in the Gulf area, and about four years experience in small plant management.

Control Equipment Company Expands With Florida Office

Control Equipment Company, 3240 Peachtree Rd., N.E., Atlanta, Georgia has opened its fourth sales and service office in the Southeast in **Orlando, Florida.**

J. J. Hoffman, formerly manager of the Columbus, Ohio office for the Wheelco Div., of the Barber Colman Company, heads up the new Florida operation. Mr. Hoffman attended Ohio State and Case Institute and before his association with Barber Colman, was an engineer with the Cleveland Electric Illuminating Company.

Mr. Hoffman will handle the following accounts in Florida: Cuno Engineering Corporation, A. H. Emery Company, Automatic Timing and Controls Company, Conax Corporation and Aeronautical Division of Robertshaw-Fulton Controls Company.

R. P. Saunders heads up the fast growing Southeastern sales agency in Atlanta. Other branch offices are in Birmingham and Washington, Georgia.

New President for Midwest Piping Co.

O. P. Carter has been elected president of **Midwest Piping Company, Inc.,** St. Louis. Having been executive vice president of the company since 1955, he succeeds the late Eric A. Kerbey.

Carter has been associated with Midwest for 28 years. He began his services as a sales engineer in St. Louis and advanced to the managership of the New England division before being named executive vice president.

Mr. Kerbey, who had been president of the firm for about three years, died suddenly of a heart attack Feb. 22.

Latrobe Steel — Fla.

Ray Neff has been appointed Southern Florida Sales Representative by **Latrobe Steel Company.**

Formerly chief engineer with Adams Engineering Company in Miami, Mr. Neff will make his headquarters at Latrobe's Miami Branch office, 4342 East 10th Court, Hialeah, Florida.

Atlantic Steel Sales Dept.

Gordon E. Brooks has been appointed Assistant General Manager of Sales for **Atlantic Steel Company.** At the same time **Connor F. Nelson, Jr.** was named to succeed Brooks as sales representative for the company's Atlanta territory.

Mr. Brooks has been connected with Atlantic Steel since 1933, and has served in the companys order and scheduling departments, as well as in various sales capacities. In 1948 he was made sales representative for north and central Georgia, and in 1953 became the Atlanta territory sales representative.

Mr. Nelson joined Atlantic Steel in 1949 after his graduation from Georgia Tech. Prior to this appointment, he was chief sales correspondent for the company's wire products division.

Industrial Combustion Acquires C-B Burner Div.

Industrial Combustion, Inc., a newly formed manufacturing company in the commercial-industrial oil and gas burner field, has acquired facilities of the former Burner Division of the Cleaver-Brooks Co., Milwaukee, Wisconsin.

J. Verne Resek, who in the past has managed this division, has the majority stock in the new company and is president. Resek is also national president of Oil Heat Institute of America and will continue to serve in this capacity.

Industrial Combustion is currently constructing a new, modern plant and engineering laboratories in Monroe, Wisconsin, which will be ready for occupancy during March, 1958. Executive offices with purchasing, accounting, parts and sales departments will be located at 4507 North Oakland Ave., Milwaukee, Wisconsin.

Howard McCoy, who has primarily been responsible for the development of the outstanding features of the Hev-E-Oil and Hev-E-Duty gas burners will be vice president in charge of engineering with offices at the Monroe plant. **Robert Harland** is secretary; **William J. DeMuth** is sales manager; **Clarence Gruber** will be purchasing agent.

Industrial Combustion has acquired all patents, machinery, tools, jigs, patterns and inventory from the Cleaver-Brooks Co. and will supply all replacement parts for existing burner equipment.

Edison Electric Institute

J. W. McAfee, President of the Union Electric Company, St. Louis, Mo., has been elected President of the Edison Electric Institute, and **J. E. Corette,** President of The Montana Power Company, Butte, Mont., has been elected Vice President of the electric industry's trade association.

Mr. McAfee, formerly EEI Vice President, succeeds **Donald S. Kennedy,** Chairman of the Board and President of the Oklahoma Gas and Electric Company, Oklahoma City, as Institute President. Mr. McAfee and Mr. Corette will serve in their new capacities until June, 1958.

Regional Managers for Reliance Electric

Further steps for establishing regional operation of Sales Districts in the **Reliance Electric and Engineering Company** are the appointments of the following Regional Sales Managers:

Emory G. Orahood becomes Southeast Regional Sales Manager covering the **Atlanta, Charlotte,** and **Birmingham** districts; and **William K. Schlotterbeck** becomes Southwest Regional Sales Manager covering the **Houston, Dallas,** and **St. Louis** districts.

E. G. Orahood, whose headquarters are in Atlanta has been Manager of the Atlanta District since 1949.

W. K. Schlotterbeck, who went to Dallas in 1956 as District Manager from Buffalo where he held a similar position, originally joined Reliance in 1939.

Cutting Tool Div. for Brown & Sharpe

Establishment of the Cutting Tool Division, under **Thomas Hollis, Jr.,** as its General Manager, has been announced by the **Brown & Sharpe Manufacturing Company** of Providence, Rhode Island.

The new organization, Brown & Sharpe's fourth independent division, will combine the design, manufacture and sale of both high-speed steel and tungsten carbide cutting tools.

Sales responsibility continue under the direction of **Colin Sharp,** and for carbide products under **Lewis B. Main.**

Southern News Briefs (Continued)

Thermal Research — South

Thermal Research & Engineering Corporation, Conshohocken, Pa., has announced a new sales agency selection for its specialized combustion and fired heat equipment. **Paul H. Chapman & Associates** will handle the Southeast territory including Florida, Georgia, Alabama, Tennessee and the Carolinas, out of offices in Elizabethton and Chattanooga, Tennessee and also Atlanta, Georgia.

American Air Filter Acquires Kennard

American Air Filter Company, Inc. has formally completed, through an exchange of common stock, the acquisition of Kennard Corporation, St. Louis manufacturer of heating and cooling coils, and heating, ventilating and cooling units. Kennard employs 200 persons in a new 100,000 sq ft plant near St. Louis.

Dixie Electrical Mfg. — Ala.

John A. Dunn has been elected President of **Dixie Electrical Manufacturing Company,** of Birmingham, Alabama.

Mr. Dunn has a wide experience in the electrical and public utilities fields. Prior to coming with Dixie Electrical Manufacturng Company, he was District Manager of General Electric Supply Company, with headquarters in Kansas City, Missouri. Before his service in the Navy in World War II, he was associated with one of the largest public utilities in the Mid-West, as Power Sales Engineer.

Dixie Electrical Manufacturing Company, operating a modern plant in Birmingham, producing a complete line of pole line hardware, is now engaged in a major plant expansion program, adding additional equipment, modern galvanizing facilities, which will give this company the most modern plant of this type in the South.

A-C — Gadsden Plant

Appointment of **R. E. Persohn** as assistant general manager of the **Gadsden (Ala.)** Works has been announced by **Allis-Chalmers.**

Persohn has been with Allis-Chalmers Pittsburgh Works since 1939 serving successively as a laboratory technician, assistant design engineer, and application engineer working on network, load center and unit substation transformers. He attended Carnegie Institute of Technology and is a member of the American Institute of Electrical Engineers.

Chain Belt — Atlanta

Robert V. Smith has been assigned as a District Sales Engineer at the Atlanta office of **Chain Belt Co.**

Prior to joining Chain Belt Company last year, he had several years sales experience in the Atlanta area.

Chain Belt's Atlanta office at 1788 Ellsworth Industrial Drive, N.W., is under the direction of **D. P. Murrill,** District Sales Manager.

Hercules Motors — Houston

Hercules Motors Corporation has moved its Houston Factory Branch to larger, modern quarters at 5031 Gulf Freeway, three-and-one-half miles from downtown Houston.

Facilities in the completely new factory branch, providing one-third more space, include an enlarged showroom and parts department, an expanded and well-equipped repair shop and new offices.

The enlarged facilities make possible larger stocks of Hercules gasoline, gas and diesel engines and power units, larger stocks of parts and expanded engine rebuilding and repair.

The Houston branch is staffed with factory trained personnel under the supervision of **James A. Embry**, regional manager and **David A. Otto**, branch manager.

Dravo — Southwest

General Equipment Sales, Inc., 605 Mills Building, El Paso, Texas, has been appointed distributor of **Dravo Corp.** heating equipment for a territory which includes 6 Texas and 12 New Mexico counties.

General Equipment Sales, Inc. will sell Dravo's complete line of oil and gas fired units. These include the Counterflo, Paraflo, and Gas-Fired suspended type heater models, covering a range of capacities from 40,000 to 2,000,000 BTU per hour output.

Kaiser Aluminum — Ark.

Delta Metals, Inc., has been appointed an industrial distributor of Kaiser Aluminum products for the State of **Arkansas.**

The area will be served by a new branch warehouse in North Little Rock. Delta Metals, with headquarters in Dallas, Texas, has been a general line distributor of Kaiser Aluminum products for several years in the Southwest.

The North Little Rock facility at 702 West Second Street will initially stock coiled and flat aluminum sheet and aluminum extrusions. The warehouse also will carry flat stainless steel sheet, stainless steel bars, copper tubing and brass fittings.

Seth Ward, manager of the new warehouse, has been a member of the Delta Metals sales force for eight years.

Link-Belt — Birmingham

Link-Belt Company has announced the appointment of **Bruce Mayo** as district manager of its Birmingham district office, according to Rod S. Galloway, general manager of the company's Southeastern Division in Atlanta, Georgia. Mr. Mayo replaces J. Ross Arnold who has been appointed to handle a special assignment at the Link-Belt plant at Colmar, Pa.

Trerice — Dallas

Richard Mill has been appointed manager of the new Dallas branch office of the **H. O. Trerice Company**, manufacturers of temperature instruments. The office is located at 4252 Harry Hines Blvd.

From Dallas, Mr. Mill will cover **Texas, Oklahoma,** and **New Mexico.**

York — South & Southwest

York Corporation, a subsidiary of Borg-Warner, has announced the appointments of three new district managers.

Theodore Y. Davis for the Middle Atlantic District, supervising activities in Pennsylvania, Maryland, Delaware, Virginia, and southern New Jersey. Since 1954 Mr. Davis has been sales manager in this district, following nine years as a sales engineer assigned to the Philadelphia office.

Manager of the Southwest District is **Charles P. Strickland, Jr.**, supervising activities in Louisiana, Texas, and portions of Alabama, Arkansas, Mississippi, and New Mexico. His headquarters will be in Houston, Tex. Mr. Strickland joined the corporation in 1946 and was assigned to the Los Angeles office as office engineer and sales engineer in which capacity he has served until this promotion.

The Southern District will be managed by **Winston W. Salmond**, supervising activities in Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee. Joining the company in 1946 as a student engineer, Mr. Salmond later served as an office engineer and a sales engineer in the Philadelphia office. In 1952 he was sales engineer in the Baltimore office and in 1954 was made branch manager of the Baltimore office.

Southern News Briefs (Continued)

Solar Aircraft Expands Ind. Prod. Div. — Sthw.

Roy M. Horlock has been named sales engineer for **Solar Aircraft Company's** expansion joints and other industrial products.

Horlock will establish headquarters in Houston, and will serve customers in **Texas, Louisiana, Mississippi** and **Oklahoma.**

Before joining Solar, he was supervisor of piping design for Fluor Corporation, Ltd., and prior to that was vessel and piping designer for F. S. West Company, both of Houston.

Niagara Machine — Ala.

Niagara Machine & Tool Works, Buffalo, New York has announced the appointment of **George M. Meriwether, Inc.,** as distributor in **Alabama** and Northwestern **Florida.**

The home office of George M. Meriwether, Inc. is at 1712 Seventh Avenue North, Birmingham 4, Alabama. The South District Office is located at 351 St. Louis St., Mobile, Alabama. The company will distribute the entire line of Niagara presses, press brakes, shears and related machines and tools.

Southeastern Div. Mgr. for American MonoRail

L. R. McEachern is now sales manager of the Southeastern Division of **The American MonoRail Company.** Division includes the Charlotte, Atlanta and Greenville offices together with Newell Equipment Company, Birmingham, and McKinney Supply Company, Chattanooga. Mr. McEachern was formerly district manager of the Greenville office.

Anderson Electric — Ala.

John H. Schuler has been appointed Vice President in Charge of Operations at **Anderson Electric Corporation.**

Mr. Schuler will now supervise manufacturing, purchasing and personnel at Anderson's Birmingham and Leeds, Alabama, plants. Before assuming his new duties Mr. Schuler was Administrative Vice President.

Roper Hydraulics — Southwest

Joe R. Hames has been appointed District Sales Manager for **Roper Hydraulics, Inc.,** covering New Mexico, Texas, Oklahoma, Arkansas, and Louisiana. He will handle Roper rotary pump products exclusively and has had wide experience in all types of pump requirements, having been in the business for eighteen years.

Mr. Hames has been traveling most of this area as a Roper representative for the past twelve years and will headquarter at 6230 Northwood Road, Post Office Box 12134, Dallas 25, Texas.

Allis-Chalmers — St. Louis

Allis-Chalmers has recently announced the appointment of **Richard R. Goetz** to service manager — midwest region, with headquarters in **St. Louis, Missouri.** He succeeds R. L. Stroope, who returns to Allis-Chalmers West Allis Works.

Western Precipitation — Pa.

Western Precipitation has recently expanded its personnel and facilities in the Pittsburgh offices serving the Appalachian industrial region.

To supplement the work of R. G. Gaw, manager of the Pittsburgh offices, who will continue to specialize in steel plant applications, Western Precipitation has assigned **John G. Rohm** as Sales Engineer in this area to specialize in power plants, cement plants and a wide range of applications other than those in the steel industry.

This wide regional and product background will be at the disposal of Western Precipitation customers in the Western Pennsylvania, eastern Ohio and West Virginia territories served by Western Pricipitation's Pittsburgh offices.

Crowe Co. — Atlanta

George F. Mills, formerly of Boston, Massachusetts and Charlotte, North Carolina, has become associated with the **Lewis M. Crowe Company** of 111 Tuxedo Terrace, N. W., Atlanta 5, Georgia, Manufacturers' Representatives in the power equipment specialty, control and instrumentation field.

Mr. Mills was most recently with the Uster Corporation of Charlotte, supplier of testing equipment to the textile industry, as service engineer, sales engineer and sales supervisor.

Cambar — Fla.

The Cameron & Barkley Co., leading Southeastern distributor of industrial supplies and machine tools, has opened a new branch at **Bartow-Mulberry, Florida.** Over 5,000 sq ft will be used to display and stock industrial supplies and equipment most needed in the phosphate area centered around Polk County.

The Bartow-Mulberry Branch is located on Florida Highway Route 60 three and one-half miles east of Mulberry. **Paul M. Clemons** will be Branch Manager and **Don L. Taylor** will be the local sales representative.

The Company, which recently moved its executive offices to 1939 Hendricks Avenue, Jacksonville, Florida, also maintains complete Branches at Charleston, S. C., Savannah, Ga., Jacksonville, Cocoa Beach, Tampa, Orlando, and Miami, Florida.

Lewis-Shepard — Memphis

The appointment of **Malcolm S. Cone, Jr.**, as its exclusive sales and service representative in Western Tennessee, Arkansas and Northern Mississippi has been announced by **Lewis-Shepard Products, Inc.**, Watertown, Mass., producer of electric fork lift trucks and related materials handling equipment.

Mr. Cone, previously a sales engineer for a mill supply firm, has headquarters at 3823 Northwood Drive, Memphis. He will maintain complete sales and service facilities for Lewis-Shepard customers in the area.

Parker-Hannifin

Appointment of **B. H. "Barney" Alstad** as sales engineer in the **Texas, Oklahoma, Louisiana** and **Arkansas** districts has been announced by **Parker-Hannifin Corp.**, manufacturer of tube and hose fittings, hydraulic accumulators and check valves.

Western Gear — Houston

William B. Caswell has been appointed Texas Regional Manager for **Western Gear Corporation.** Caswell will have his headquarters at Western Gear's Houston Works located at 117 North Palmer Street, Houston.

Caswell has had wide experience in many phases of his company's operation and was formerly Works Manager at Western Gear's Lynwood, California plant where he started work in 1943.

Mississippi Mfgrs. Assoc.

John A. Osberg, general manager of Rockwell Manufacturing Company's Tupelo, Mississippi, power tool plant, has been elected president of the **Mississippi Manufacturers Association.**

Mr. Osberg has played an active role in the Association since he assumed managership of the recently expanded Tupelo plant in October, 1950, while it was still under construction. He was named to the MMA board of directors in 1953 and elected secretary-treasurer in 1954.

FUTURE EVENTS of Engineering Interest

May 1-2: 7th Southern Municipal & Industrial Waste Conference, Duke University, College of Engineering, Durham, N. C. J. W. Williams, Prof. of C. E., Duke Univ., Durham, N. C.

May 1-2: Metal-Cutting Review Seminar, American Society of Tool Engineers, Bellevue-Stratford Hotel, Philadelphia, Pa. ASTE, 10700 Puritan Ave., Detroit 38, Mich.

May 1-8: 26th Annual Meeting, American Society of Tool Engineers, Philadelphia Convention Center, Philadelphia, Pa. Richard Gebers, Public Relations Mgr., ASTE, 10700 Puritan, Detroit 38, Michigan.

May 11-15: Oil & Gas Power Conference & Exhibit, American Society of Mechanical Engineers, Bellevue-Stratford, Philadelphia, Pa.

May 12-16: Southwestern Metal Exposition, State Fair Park, Dallas, Texas. W. H. Eisenman, Mgr. Dir., 7301 Euclid Ave., Cleveland 3, Ohio.

May 13-15: American Institute of Electrical Engineers, East Central District Meeting, Huntington, W. Va.

June 6: Public Utilities Accident Prevention Conference, Public Utilities Association of the Virginias, Hotel Roanoke, Roanoke, Va.

June 9-12: Material Handling Institute Exposition, Public Auditorium, Cleveland, Ohio. Clapp & Poliak, Inc., 341 Madison Avenue, New York 17, N. Y.

June 15-19: Semi-Annual Meeting, American Society of Mechanical Engineers, Statler Hotel, Detroit, Mich.

June 23-25: Joint Meeting, American Society of Heating & Air-Conditioning Engineers, Inc. and American Society of Refrigerating Engineers, Hotel Leamington, Minneapolis, Minnesota.

Aug. 7-9: North Carolina Hospital Engineers Association, Inc., Annual Convention, Sir Walter Hotel, Raleigh, N. C. Henry W. Miller, Pres., NCHEA , Oteen, N. C.

Sept. 15-17: American Institute of Electrical Engineers, Petroleum Industry Conference, Baker Hotel, Dallas, Tex.

Sept. 15-17: Process Industries Conference, American Society of Mechanical Engineers, Statler Hotel, Buffalo, New York.

Sept. 18-21: 40th Annual Meeting, Public Utilities Association of the Virginias, Greenbrier Hotel, White Sulphur Springs, W. Va. R. W. McKinnon, Exec. Secy., PUAV, 602 First Federal Bldg., Roanoke, Va.

Classified Ads

CLASSIFIED RATES

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Index of Advertisers

This Advertisers' Index is published as a convenience, and not as a part of the advertising contract. Every care will be taken to index correctly. No allowance will be made for errors or failure to insert.

Erected by: THE FULTON-DEKALB HOSPITAL AUTHORITY, ATLANTA, GA.

Architects and Engineers: ROBERT AND COMPANY ASSOCIATES, ATLANTA, GA.
General Contractor: ROBERT E. McKEE GENERAL CONTRACTOR, INC., DALLAS, TEXAS
Piping Contractor: J. S. BROWN-E. F. OLDS PLUMBING & HEATING CORPORATION, EL PASO, TEXAS
Fire Protection System: GRINNELL COMPANY, INC.

GRADY MEMORIAL HOSPITAL
selects JENKINS VALVES
for long service life

Looked at from any angle, Atlanta, Georgia's new $21,000,000 Grady Memorial Hospital—1069 beds, 17 operating rooms—is designed for economy in upkeep as well as efficiency. Like all operating equipment, the valves selected for this modern hospital had to pass a tough "physical".

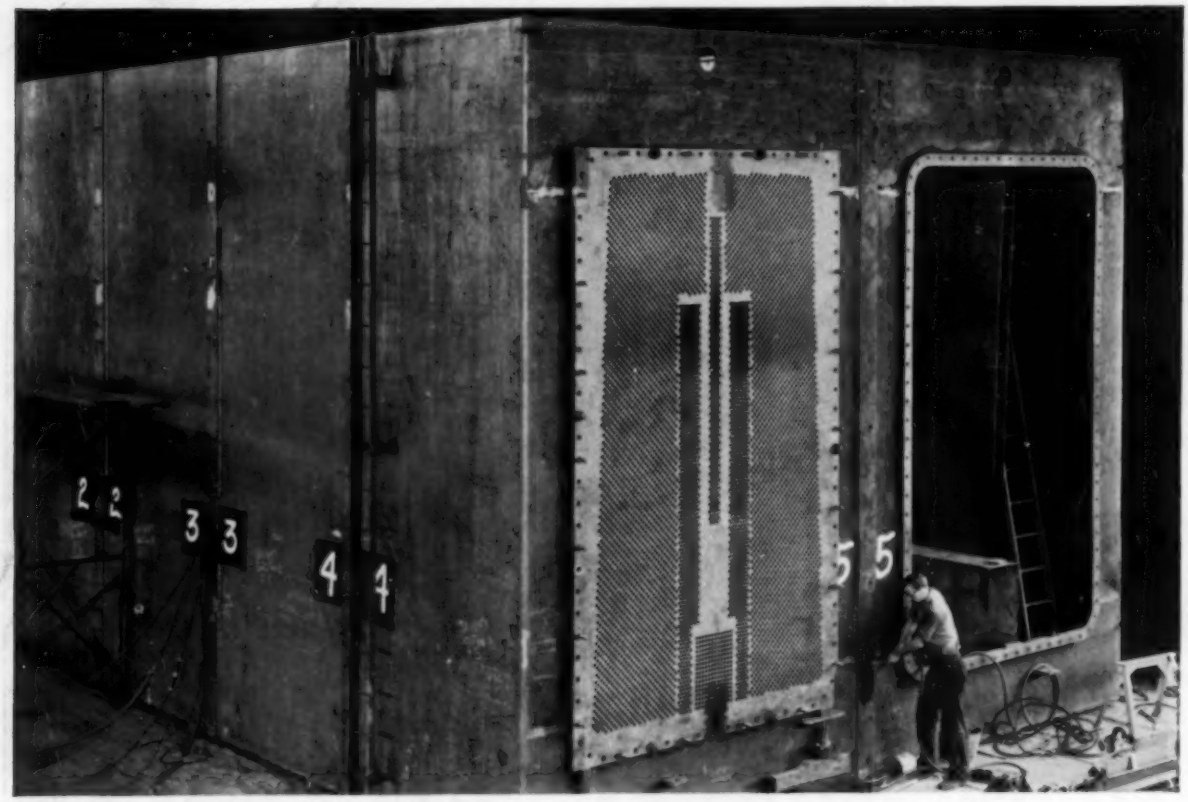
Hospital authorities and builders had no difficulty agreeing on the specification "JENKINS" for all standard valves in the 21-story building. The extra measure of performance and reliability built into Jenkins Valves for generations assured long operating life, and low maintenance cost.

No other valves have such a long record of efficient, economical service. A good thing to remember when you select valves . . . especially since the valves that bear the famous Jenkins Diamond mark *cost no more.* Jenkins Bros., 100 Park Avenue, New York 17.

Valves on fire protection lines are among thousands of Jenkins Bronze and Iron Valves on duty at Grady Memorial Hospital.

JENKINS
LOOK FOR THE JENKINS DIAMOND
VALVES
JENKINS
SINCE 1864
Jenkins Bros.

Sold Through Leading Distributors Everywhere

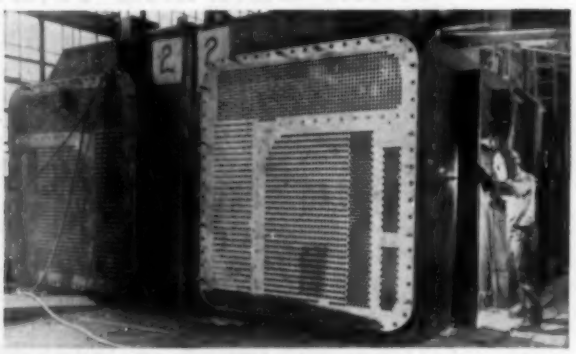


HERE'S ONE SHELL of this twin-shell, triple-lane unit just before shipment to Consolidated Edison's Astoria Station. It's designed to condense 1,600,000 lbs. steam/hr. at 1.87" Hg., with 244,000 gpm circulating water, and has 27,450 aluminum-brass tubes. Unit serves 335,000 kw turbine.

HUGE, SINGLE-PASS, 187,000 sq. ft. CONDENSER

... designed and built by C. H. Wheeler is now being installed at world's largest metropolitan utility

VICE-PRESIDENTS LEE YETTER and Roy Droescher, and Chief Engineer Paul Hamm are responsible for the design and construction of all Wheeler condensers. They work with engineers employed by C. H. Wheeler's customers, with turbine manufacturers' engineers and consulting engineers in BTU chasing.



TYPICAL REVERSE FLOW CONDENSER is this 35,000 sq. ft. unit for a Southern electric utility. Patented Reverse Flow feature permits flushing debris from tubes with only slight (and momentary) vacuum loss. Note low height to save head room, rectangular cross section to further utilize space for this Wheeler client.

C. H. Wheeler Mfg. Co.

19TH & LEHIGH AVENUE
PHILADELPHIA 32, PA.

Steam Condensers • Vacuum Equipment • Centrifugal, Axial & Mixed Flow Pumps • Marine Auxiliary Machinery • Nuclear Products